P.V. SUPA
Process Improvement Applications

SUPA Self Operated Library manual

Table of Contents

Introduction

This manual describes the SUPA Self Operated Library system. Topics covered are the use, configration, and troubleshooting. Main focus is on software components, hardware is covered on overview level.

Ordering

When planning or ordering a self operated library system, some information is requried in order to make a delivery.

Number of entrances and number of doors at each entrance. This is important so that the correct number of entrance units, controller units and secondary readers can be provided.

Does the system use barcode patron cards only, or RFID/Mifare, or both. This affects the way the entrance units are constructed. Some of the parts in the physical units are different for different reader types and combinations, and can not be changed after the units are built.

Number of speakers to install, and type of speakers - surface mounting or embedded, analogue or IP speakers. Determines what speakers are provided with the system. The library can also opt to use their existing speakers. For analogue speakers, just about any type will do, but for IP speakers only certain models are supported. Check with Supa if the existing speakers will work, before ordering.

Distance between the main control unit and the main entry panel. This determines the length of cabling provided with the units. For data cables, too long cable runs may cause problems in the functionality of the readers. For power cables, some power loss is always to be expected and the longer the cable run, the more power is lost. Excess cabling should therefore be avoided. All cables can be changed on site, but it requires some fiddling and is not very easy, so to begin with correct cable lengths makes life easier.

Hardware components

This chapter describes the hardware components included in the Self Operated Library System.

Main controller

Main controller is basically just a box, housing many pieces of the system in one piece. This box contains the main computer, audio amplifier, the IO controller, relays and power sources and the extender local end for the connection of the entrance unit.

This box is typically installed on wall inside the library. It must have a maximum of 30 meters direct cable run to the entrance unit.

The main controller box dimensions are 400mm wide, 500mm high and 210mm deep.

Main controller - box

Main controller - inside

Main computer

Each entrance requires a computer to run; on computer can only operate one entrance. Two doors can be controlled in one entrance, when one of them only has a songle barcode reader without a display or pinpad.

The main computer operates the entrance unit, runs the entrance software to instruct patron in entrance process and operates the IO for doors and lights. It also runs the master controller and library controller services, which handle SIP communications, scheduling of events, security camera picture storage and indexing and audio announcements.

The main computer has storage for security camera pictures. The SOL controller software automatically cleans this storage, removing pictures older than specified time, to keep the space available for new pictures.

The computer is the same as in any other Supa devices: Advantech UNO 2473G. It has a 32 GB mSata disk as the system disk, and unlike in other Supa devices an additional 480 GB SSD for camera image storage. The secondary disk is a regular ATA connected SSD which can be easily replaced if needed, for example should it ever fail or if more space is required.

The operating system is Windows 10 IoT LTSB Enterprise, 64 bit.

It is also possible to an entirely separate server for image storage. For this use, a Lenovo ThinkServer TS140 is available from Supa.

Entrance unit

The most visible new part is the entrance unit. Key design goals have been durability, eas of use and installation, not forgetting usability either.

The unit is mainly built of roster steel and has a very durable multi-layered construction. Only two cables need to be brought from the entrance unit into the library; one carrying low voltage power (24V) and the other the data signals. These have a maximum running length of 30 meters from the entrance unit to the IO module.

The unit is entirely operated with the steel keyboard; it has no touch-screen, which allows the screen to be covered under a tough glass, to prevent vandalism or to at least make it a bit more difficult to break anything.

The entrance unit is a “dummy” unit; it has no computer in it, all the logic and data processing is done inside the library, in the server running the entrance software. Thus, should the entrance unit break, changing it or any component in it requires little if any configuration work. It is also kept simple to keep it as inexpensive as possible, as it is the part most exposed to the elements and potential vandalism.

Entrance unit

IO controller

This module is what connects the doors and lights to the system. It contains an IO module for connecting relays and signal voltage connections, and is controlled by the SOL controller software. Connection to the main computer is via serial cable. This means that the distance from

the main computer is somewhat limited. Typically the main computer is installed physically in the same enclosure as the IO controller, but the main computer can, if needed, be installed outside the box. Recommended maximum distance between the IO controller and the computer is 5 meters.

IP cameras

The system supports using Axis cameras for taking and storing images. Any number of cameras can be connected to the system. The cameras are configured to store pictures to an FTP server, which in this case is the SOL Controller; the controller has built-in FTP support and handles storing the images, indexing them in the database and cleaning up old images after certain time. The cleanup time can be controller via settings and is by default 14 days.

Supported camera models are:

M3007-V: Ceiling mounted

M3025-VE: Wall or ceiling mounted

M3045-V: Wall or ceiling mounted

Most other Axis cameras will probably work as they typically use the same methods to stream live video and store images, but there is no guarantee outside the models specified here.

Note: the system only supports storing images, not video. Images can be configured to be stored as a sequence, which can then be played back as if it were a video.

The cameras need to be configured by using the provided web application.

IP Speakers

In addition to regular, analogue speakers, the system supports AXIS IP speakers, which are connected through the network. These contain built-in amplifiers and use power over ethernet (PoE) when available.

Axis IP speaker model is C1004-E for surface mounting, or C2005 for ceiling mounting, available in black or white color.

IP speakers need to be configured either using the web application from their built-in webserver, or the automatic configuration of SOL Administrator.

External reader

It is possible to connect an external door reader to an entrance; the external reader would typically be connected outside the library and control only the outer door, after which the main entrance unit is installed, controlling the actual door to the library.

The external reader does not have a screen or a pin pad, only barcode - and optionally RFID/Mifare - reader. It does not validate patron PIN code, only that the patron exists and is valid for entry. Once the patron has been granted access from the external reader, a new validation needs to be done in the actual entrance unit with PIN code verification.

The external reader can control separate IO channels, to open a different door than the main entrance unit would open.

Software components

This chapter explains the various software components that make up the whole Self Operated Library system.

The following software components are needed to set up a self operated library:

- Master controller: to handle the database related tasks such as storing and retrieving settings, sending wake up and shut down commands and gathering statistics
- Management Utility: much of the settings are done in Management Utility just as for any other SUPA software.
- SOL Controller: Self Operated Library controller is used to control an IO module, handle images coming from security cameras, play audio messages and execute library state changes on schedule.
- SOL Entrance: The visible UI of the entrance unit, what the customers use to gain entry to the library when it is in self-operated mode.
- SOL Administrator: Admin tool specifically for the self operated library related functionality, such as controlling and monitoring services and viewing alerts and images. Also used to configure the IO, audio and camera settings.

All are pre-installed on a device provided by Supa.

Master controller

Behind everything else is SUPA Master controller service. This service handles the communications between the various other software components, settings retrieval and storing to and from the main database, status monitoring and updates as well as sending shutdown and power on messages to computers and self service units.

The main schedule also runs on Master controller; thus, Master controller needs to be installed to where it will not be shut down.

There must always be at least one Master controller in a self operated library. One is also the best option; it is possible to have more, but then the data is not shared among all units, which breaks the idea of a single control channel.

Management utility

Same Management utility as with any Supa software is used for some settings of the system.

SOL Controller

This is the main "brain" of the system. It hosts a number of functions and at least one instance is always required per library. It acts as an FTP server for the security cameras, broadcasting server for the speaker system and an IO controller for the building automation and electrical door lock controls.

The SOL controller is a single Windows service. Settings are controlled mostly through Management utility, as with any Supa software. The actual configuration of the self operated library is done using a separate tool, SOL admin.

It is possible to have more than one SOL controllers running in a library. Typically this would be in a larger library, where different parts of the library need to have different schedules and possibly have different entrances to control. Each SOL controller can control one IO module, which has a fixed number of input and output channels available for control and monitoring. Extending beyong this limit means adding more SOL controllers.

SOL Entrance

In the entrance unit, a special software runs displaying a user interface to patron. This is the piece of software a patron sees when entering the library during unmanned operation.

Entrance software has been designed to be as simple as possible, with step-by-step phased guidance through to presenting a library card, entering a PIN code should it be required by the library and then welcoming the user in.

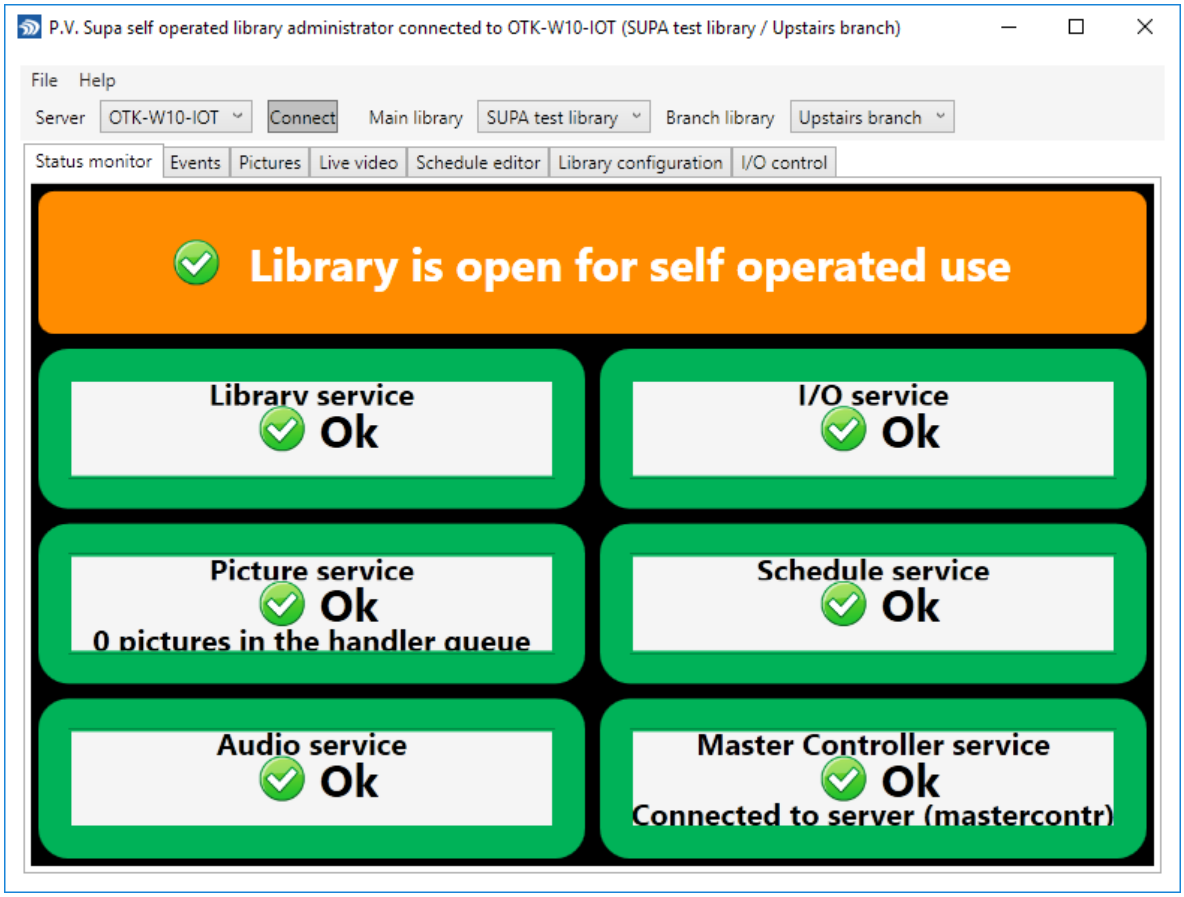
The software allows free translations to all on-screen texts, as well as changing all pictures.

SOL Administrator

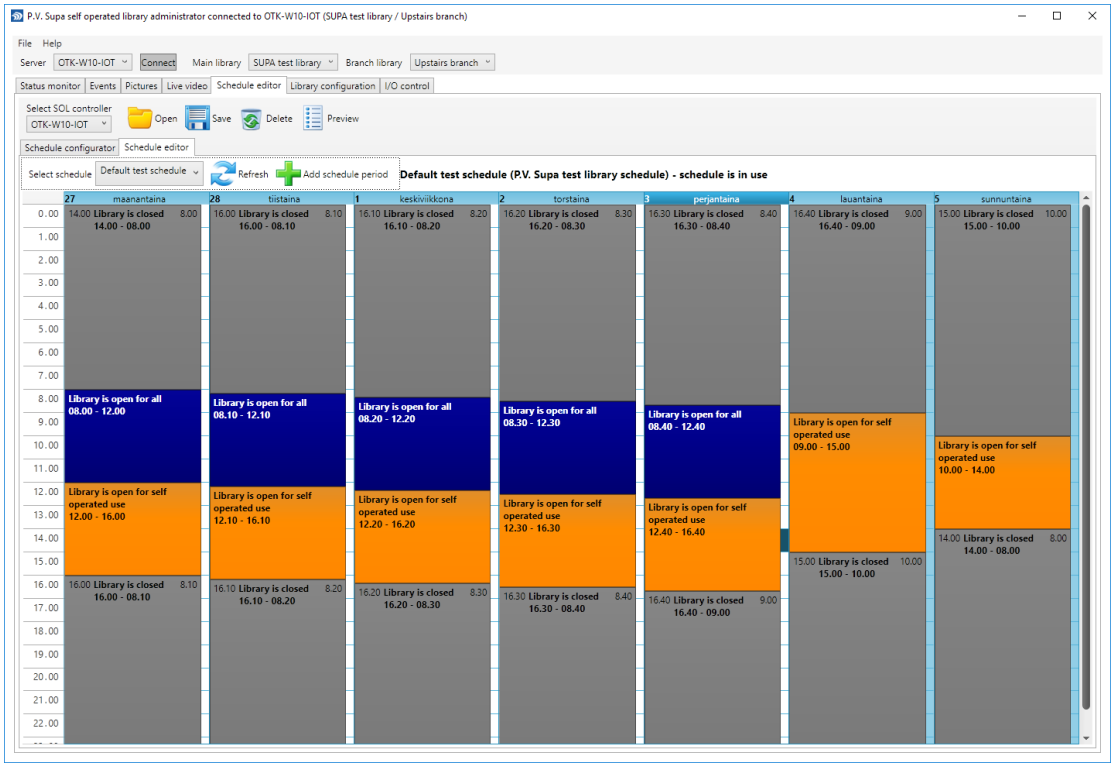
This is the main user interface tool for configuring a self operated library, as well as monitoring its operations and making changes to any piece of the configuration, or schedules or announcements.

The SOL admin tool can also be used during setup to monitor and simulate IO events, such as door lock opening, door open state monitoring and turning on or off the lights in the library.

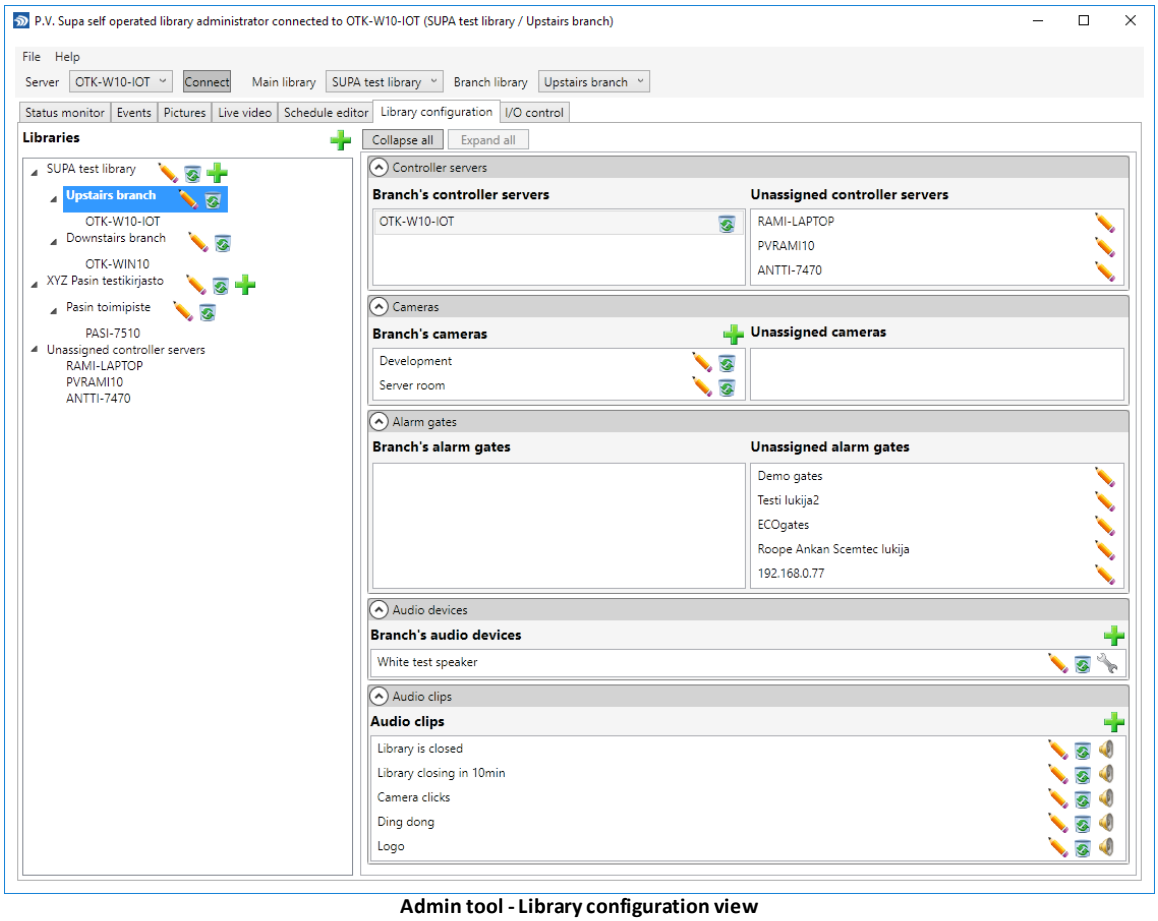
The admin tool has a user interface to view images saved by the security cameras, in a timeline as a filmstrip, and to see their connections to gate alarms. There is also a live view mode which allows monitoring live video stream from cameras, one or more at a time.



Admin tool - monitoring view



Admin tool - Schedule view



Admin tool - Library configuration view

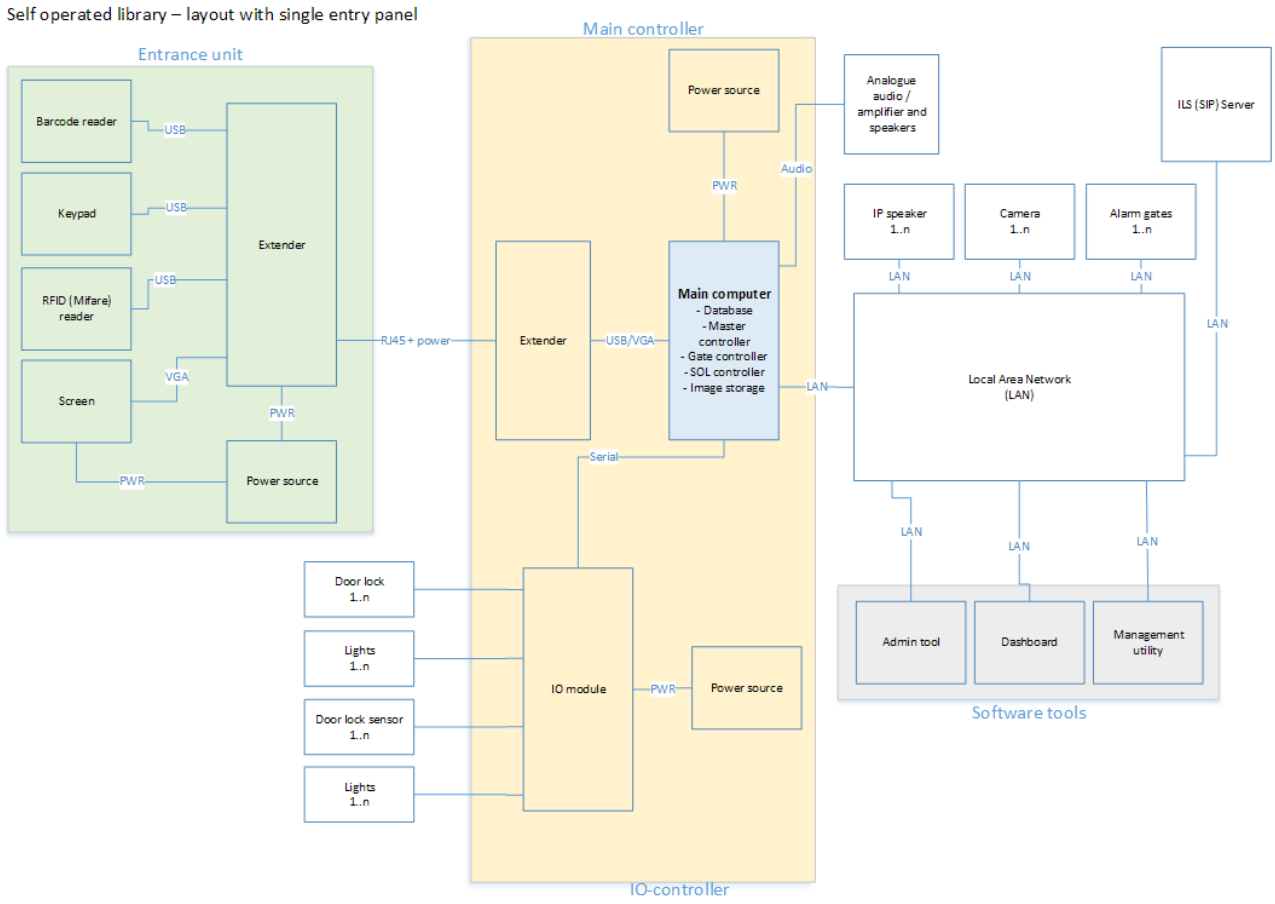
System configurations and options

The system can be configured in different ways, depending on the requirements of a library. This chapter describes the different combinations.

Most differences have some effect on cabling and installation. These affect what types and combinations are delivered. Thus, it is important to know before ordering, which combination is required for a library.

Single entrace

This is the simplest configuration, with only a single entrance unit to cover a single door to a library.

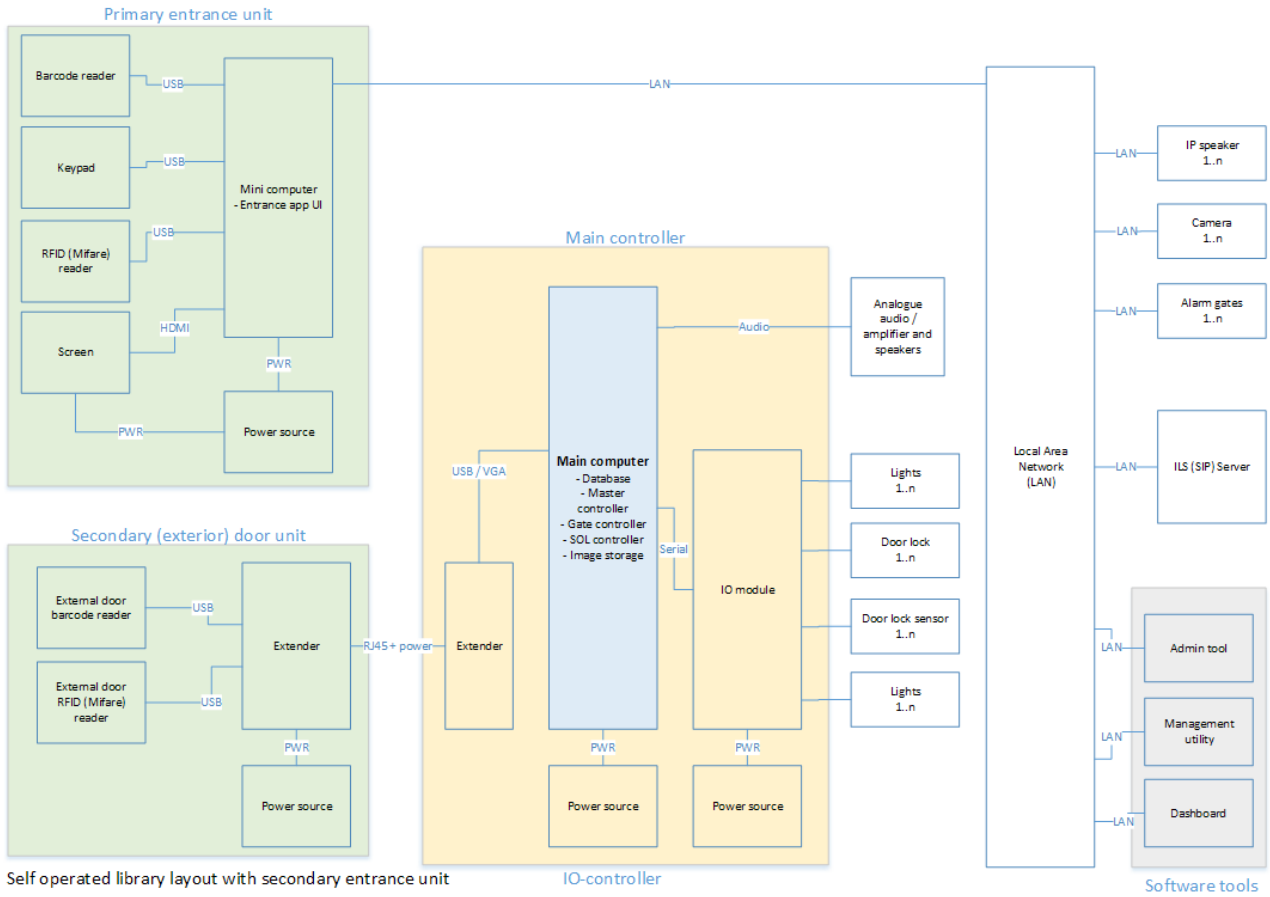


Single entrance configuration

There is only one entrance unit (green box in the picture). It connects to the main controller unit with two cables, one carrying data and one power. Power can optionally be taken from other source using a separate power unit, for example if cabling is difficult between the two end points.

Two doors with secondary entrance unit

This configuration has two doors to control, one of which is marked as *secondary entrance unit*. This unit is different from the main entrance unit in that it contains no screen or numpad for entering a PIN code.



Layout with main entrance unit and secondary reader unit

In this layout, the user must first enter a building by showing their library card to the secondary reader. This will cause the system to verify the existence of the patron and that the patron is allowed access to the library, but **not** validate a PIN code. If the validation passes, a first door or set of doors is opened. Typically this would be an entry to a building that possibly has more functions than just a library - a community center for example.

After this first (which is slightly confusingly called *secondary* because from the system point of view, it is a lesser entrance unit) entrance, there is a proper, full entrance unit with display and PIN entry panel, which the user must again use.

The main entrance unit is different from a single unit system! It has a small computer inside. This changes the installation slightly, in that the unit does not have a direct connection to the main controller, only LAN. The main entrance unit must also have a power source installed somewhere. It is possible to take the power as a direct cable from the main controller just like for a single unit configuration.

Multiple entrances

If a library has multiple actual entrances, each entrance needs to have a separate main controller and entrance unit. This is because the different entrances have different doors to control and monitor, and one control unit can only handle so many IO channels.

As a consequence, the number of entrances to a library is not limited; as long as all of them have their own controller units, they work separately and only share Master controller and database.

Setting up the software

This chapter covers topics of setting up software for a fresh installation of self operated library. It is assumed here that a new unit is at hand, with nothing ready.

This chapter only covers a single entrance unit system, with the entrance application running in the controller computer.

Install TeamViewer host service

Install and set up TeamViewer host service as the very first step. This allows remote control during installation, without having to swap cables during the installation constantly.

Use only the Teamviewer host installer, not the full Teamviewer. Make note of the ID and provide a sufficiently complex password. Remember to store the password safely!

Install Master controller

Install Master controller on the SOL controller computer. It may not be used in the actual library installation if there is another server hosting Master controller, but it is needed for convenient testing.

Use the latest Master controller available. Minimum required version is 1.6.6288. Install it normally with defaults.'

IMPORTANT: If the Master controller version is **less than 1.6.6323,** then **before starting it** set one setting to enable the self operated library functionality. This is not needed for 1.6.6323 or later versions.

The setting is stored in the Master controller configuration file, at

```
C:\ProgramData\PV-Supa\MasterController\MasterControllerSettings.config
```

This is a simple XML file with some configuration options for Master controller. The setting you are looking for is **EnableSelfOperatedLibraryService**; set the value to **true** like this:

```
<EnableSelfOperatedLibraryService>true</EnableSelfOperatedLibraryService>
```

If this setting is not already in the config file (default value being false), then the Master controller version is too old!

Save the file. Next, you need to install Management utility to be able to license Master controller.

Install Management utility

Management utility is needed to at least be able to license Master controller, and furthermore to set up the self operated library settings, both controller and entrance application.

There is nothing special to installing Management utility. Make sure you have the latest available version. Minimum version required is 1.6.6250.

Licensing

The only piece of the puzzle that needs licensing is Master controller; everything else is dependent on it, so there are no licenses required for the rest of the software.

Remember to select the correct license version, which is always 2 for any Master controller version with support for self operated library systems.

Install SOL controller

Install Self operated library controller service normally. It requires a client connection to Master controller, which is easiest to control by having Management utility installed and tested to connect to Master controller.

SOL controller is a Windows service and requires to be started manually once, after installing. After that it will start automatically with the computer.

Install Entrance appication

Install the Entrance application. There's nothing to do in the installer, just run it through with default values. It connects to the Master controller for settings and SOL controller for the actual use; the Master controller configuration is done in the Client.ini file as with any Supa software, and the SOL controller is set in Management utility.

Run the software once after installing, to get the settings to Management utility. The default code to close the Entrance application is to type "exit" and press Enter.

Install SOL administration tool

SOL Administrator is a software used to configure the self operated library system, Cameras, IO , audio announcements, schedule and everything. It is also used by the librarians to monitor the whole system and to modify library opening hours.

Begin by installing the SOL Administrator. There is nothing special about the installer. After installing the SOL Administrator connects to Master controller like any other Supa software for some main settings. Much of the actual library configuration is done in the SOL Administrator, and stored in Master controller database.

Run the software after installing, to get the settings to Management utility.

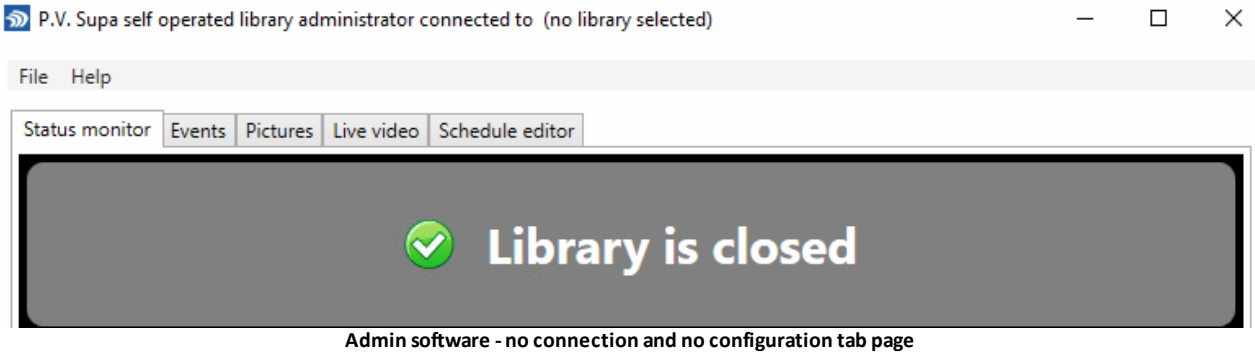
Configuring the system

This chapter covers the various configuration parts that need to be configured in order to make the whole system operational.

Configure main library and branch library in controller

The system consists of main libraries and branch libraries as a hierarchy. At least one main library and one branch must be created. In the simplest setup, these are the same actual library.

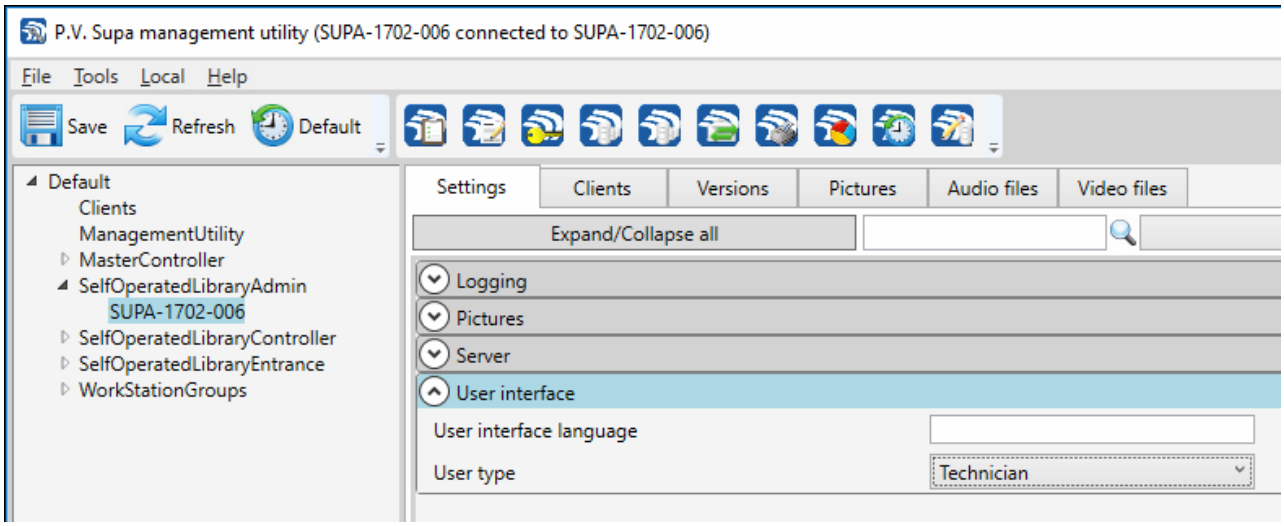
Start the SOL Administrator. You may get an error at first start when not everything is correctly configured, but that can be safely ignored. At first start, the system is likely to look like this:



Admin software - no connection and no configuration tab page

By default it will display the library being closed, because there is nothing configured. There is also no "Library configuration" tab page visible. This is because the default view is meant for library staff, and has only monitoring and pictures and schedule related options available.

To get the config tab to show up, close the admin tool and go to Management utility. I MU, change the setting under **SelfOperatedLibraryAdmin / [machine name] / User interface / User type** to **Technician:**

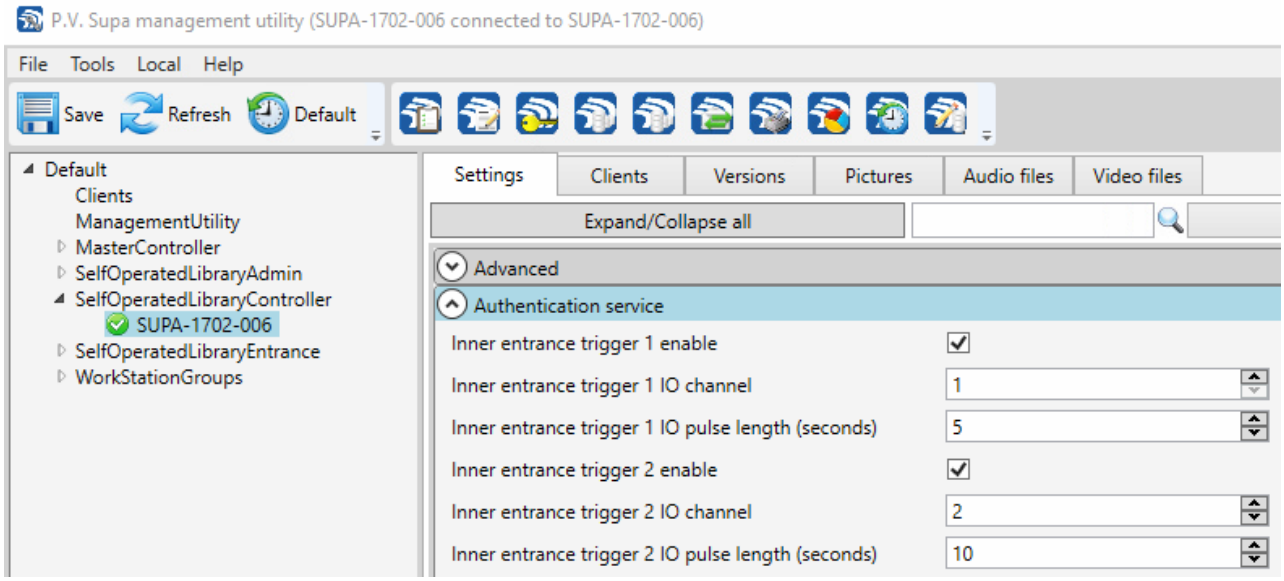


Setting the Admin tool interface in Management utility

While in Management utility, there are some other settings to configure for the **SelfOperatedLibraryController**. In **Authentication service** settings group, set the Inner triggers 1 and 2 to enabled, and set their times to for example 5 and 10 seconds. These triggers are activated when the entrance application gets a valid patron and pin code, and they control the IO module channels. Thus, with this setting, if a valid login is received, the IO channels 1 and 2 will be set for 5 and 10 seconds respectively.

Important note! The channel numbering in the Omron IO module begins from 0 (zero), while in the Management utility settings the numbering begins from 1. So if you connect the lock cabling to Omron IO channel 0, it is controlled by channel 1 in the MU settings. This is due to some initial decisions made, to speak of "first channel" when connecting things to first available slot - we feel it makes more sense for the first channel to have number 1 than zero.

The settings should be as follows:



Next, make sure the serial port parameters in setting **IO Service / Serial port parameters** is correct; by default a unit provided from Supa should have port 2 selected, and the IO module connected to the COM2 port of the main computer.

To enable all services of the system, open the **Services** settings group and enable all serivces that are used in this system. You can safely enable all if you do not know what are needed, they use very little resources when not used. These are all the services that the system can host:

Audio service is responsible for playing audio announcements. It should be running on the computer from which the speaker system gets input.

Authentication service is used by the entrance software to validate patron identifiers and PIN codes, when a user attempts to access the library during self operated hours. It handles the SIP connection to the library system and also manages the white-/blacklist of patrons that are allowed or denied entry, regardless of what the library system says.

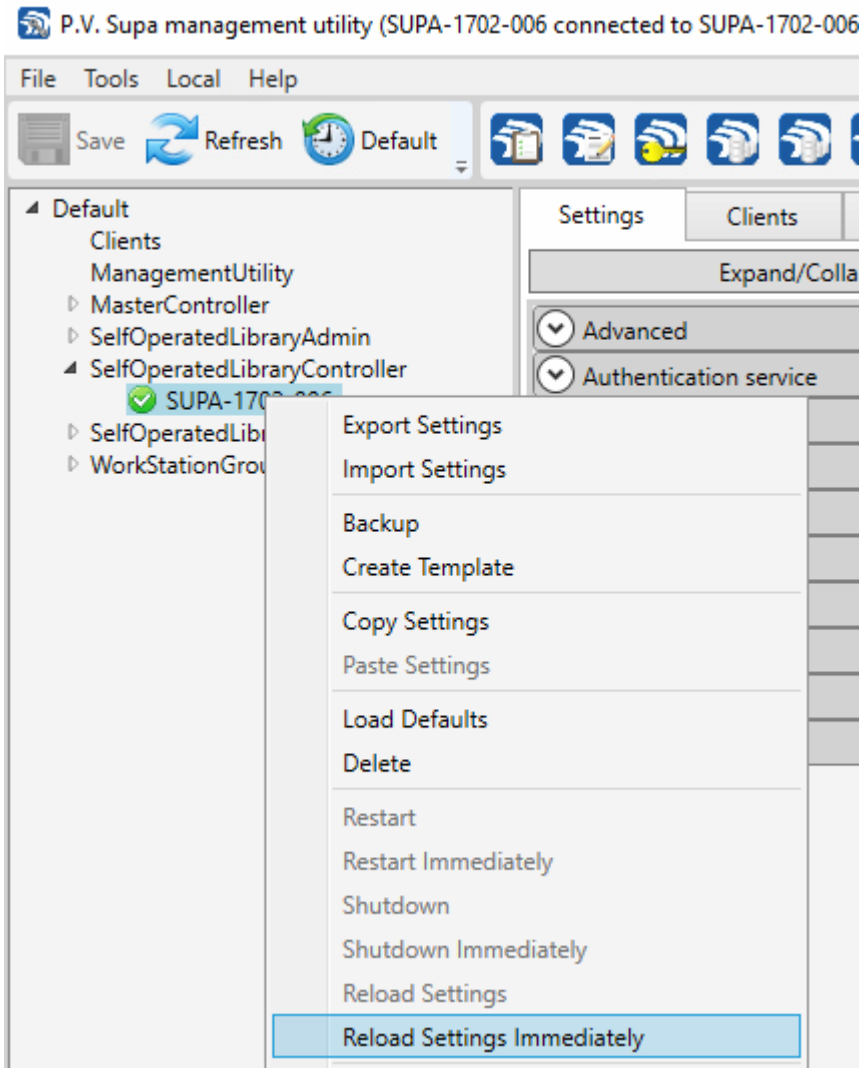
IO service handles the IO module, sending commands to set or unset channels, and reading input values. This is required if any doors are controlled or monitored, as well as lights.

Picture service is the service that receives pictures from cameras. It has a built in FTP server which receives and stores pictures, and an indexing service which creates thumbnails and updates the main database index of pictures. Pictures are stored as files on the file system, only the index is stored in the database.

Scheduler service manages the library schedule, setting states and IO commands at selected times.

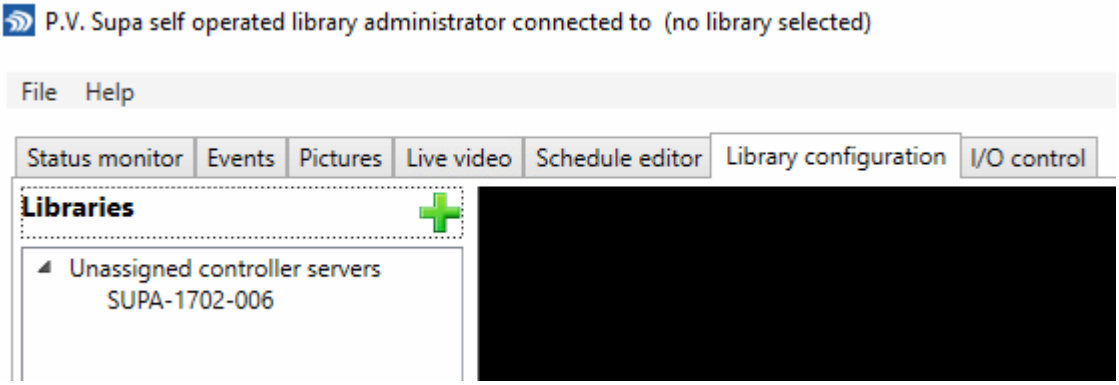
To set where the camera pictures are stored, open the **Picture service** settings group. The default value in **FTP server's root folder** is **C:\FtpRoot** - typically you do not want this on the system disk. The units provided by Supa will have a larger disk in the main computer, so set this to something like **D:\pictures** . The folder does not have to exist, it will be created automatically by the service.

Save settings in MU. To get the service to react to the new settings, you must reload the settings - they are not automatically updated, to prevent unfinished work from causing problems in the system. Select the controller in Management utility, right click on it and select **Reload settings immediately**:



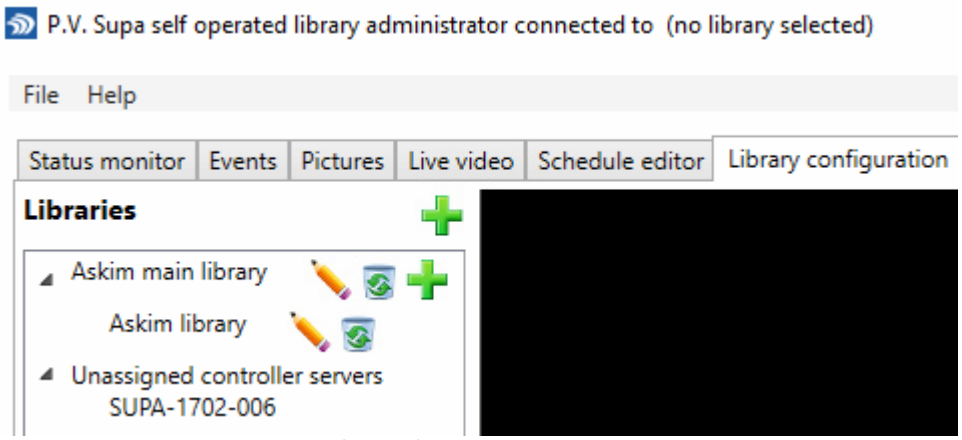
Reloading library controller settings in Management utility

This will cause the library controller to restart the internal services. After this you can restart Admin software, and now you should see the library configuration tab in the Admin software. Open the tab, and you will see only one library controller server listed as Unassigned:



Unassigned library controller server

This means that the Admin software finds one library controller service, but it has not been connected to any library. It can't be connected before any libraries exist, so click on the green plus sign to create a library. Give it a name that makes it easy to identify. Then select it from the tree and click on the green plus sign next to the name, to create a branch. Name it correctly, and save. Now you should have something like the following:



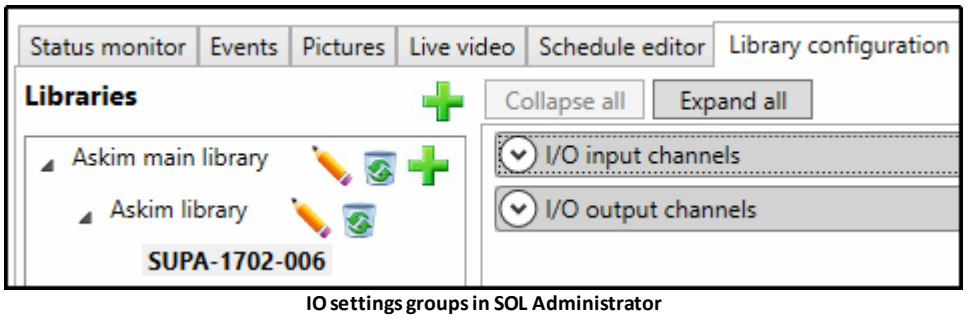
Admin software - first library and branch created

Next thing is to select the branch library. This will make settings of that branch to appear on the right side. Select **Controller servers** from the settings and expand it. You will see two boxes, on with the controller servers assigned to this branch, and one with unassigned - not connected to any branch - servers. Select the unassigned server and click on the pencil icon to move it to the Branch's control servers list.

The control server is now assigned to this branch, and can be further configured.

Configuring IO channels

Select a branch library computer to see the I/O settings groups:



IO settings groups in SOL Administrator

You can give the IO channels more meaningfull names here. For example the default for output channels are:

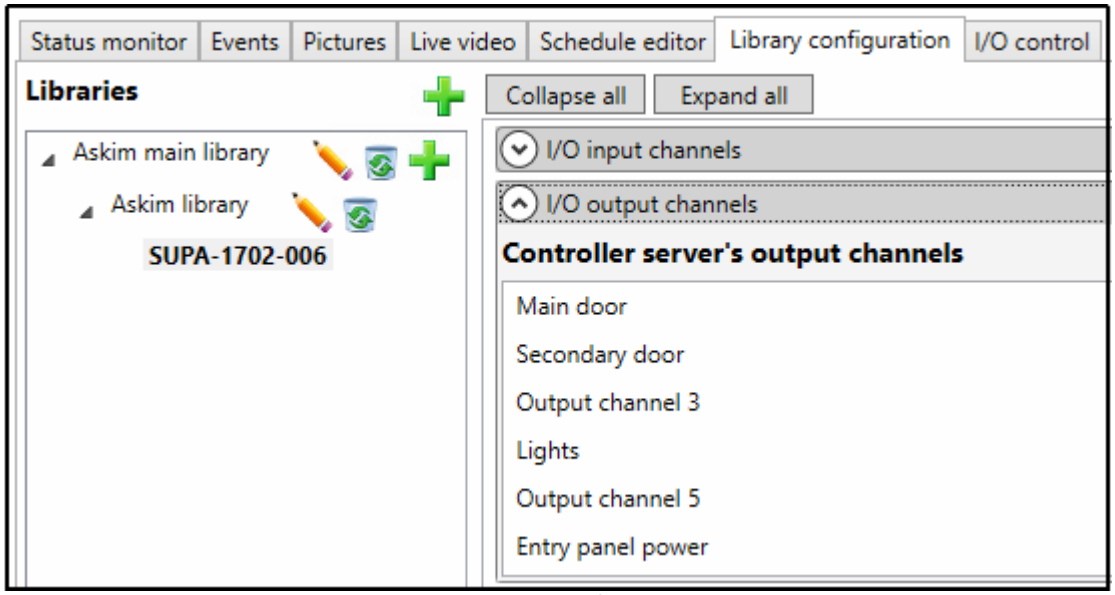
1 - Main door

2 - Second door

4 - Lights

6 - Entry panel power

(Remember that the channel numbering in the actual IO module connector begins from 0 (zero)).



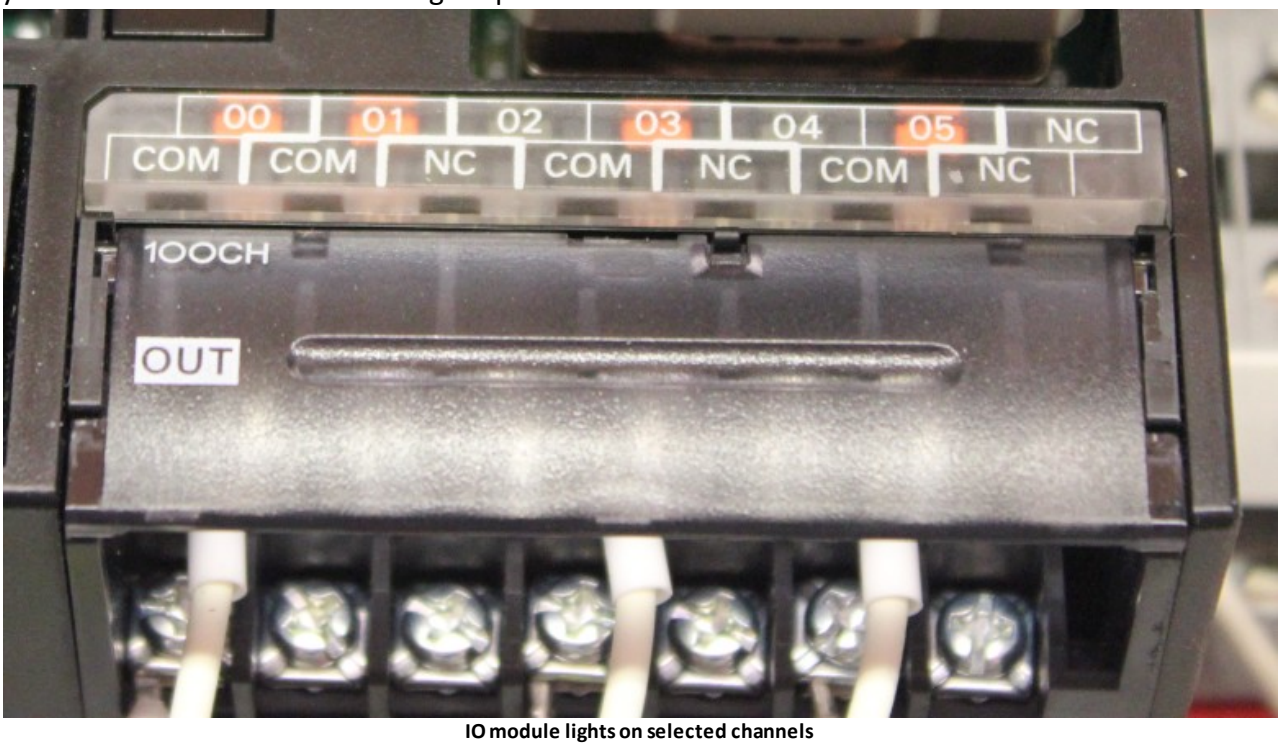
IO channels configured

The entry panel power is not connected directly through a relay by default, it is used as a spare to enable this connection and can be used for something else if needed. In a similar way, the second door is not needed if there is only one door to open.

You should now be able to open the **I/O control** tab and test the IO module. The page looks like this:

IO control testing

Click on the **Connect** button first to connect to the IO module, and then click on any **Set** button - you should see an indicator led light up in the IO module



IO module lights on selected channels

On this picture, the same channels are indicated by the led lights as set in the IO testing page.

If there are any **input** channels connected, the status of the inputs can also be seen on this page.

Remember to disconnect from the module by clicking the **Disconnect** button before exiting.

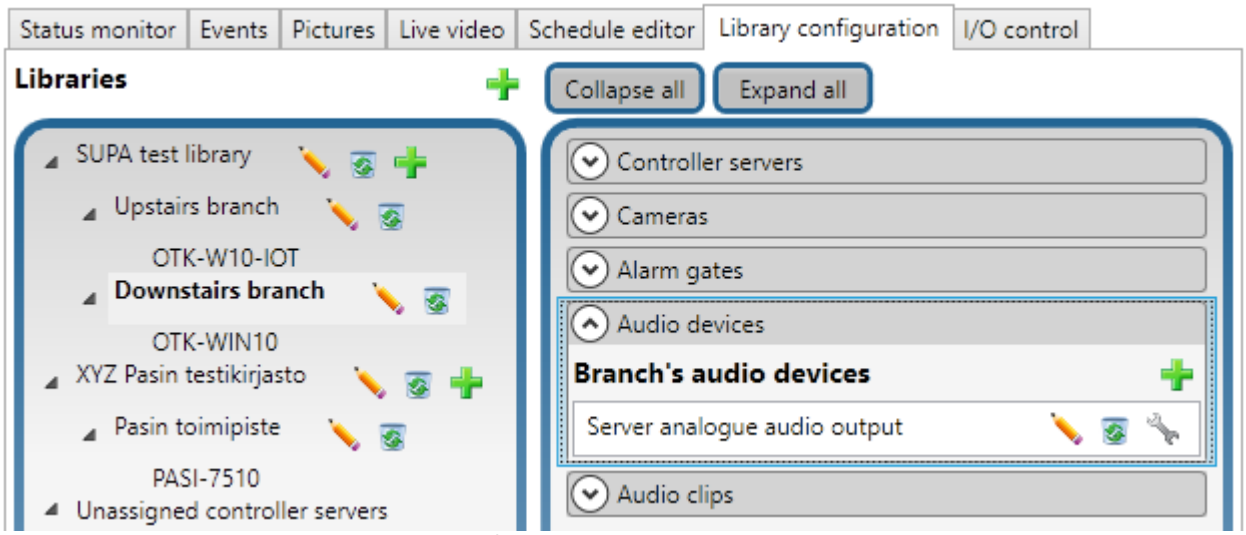
Configuring audio devices

Audio devices are used to play audio announcements in a library at specific times, tied to schedule periods. Typically these would be announcements to inform customers that the library is about to close, which would be played some minutes before the actual closing time of a library.

There may be multiple audio devices in a library, if IP speakers are used. This allows different announcements to be made in different parts of a library, or the same ones with volume controlled independently. If analogue audio device is used, the audio is played through the sound card of the main controller computer, which only allows a single audio at a time, at one volume level.

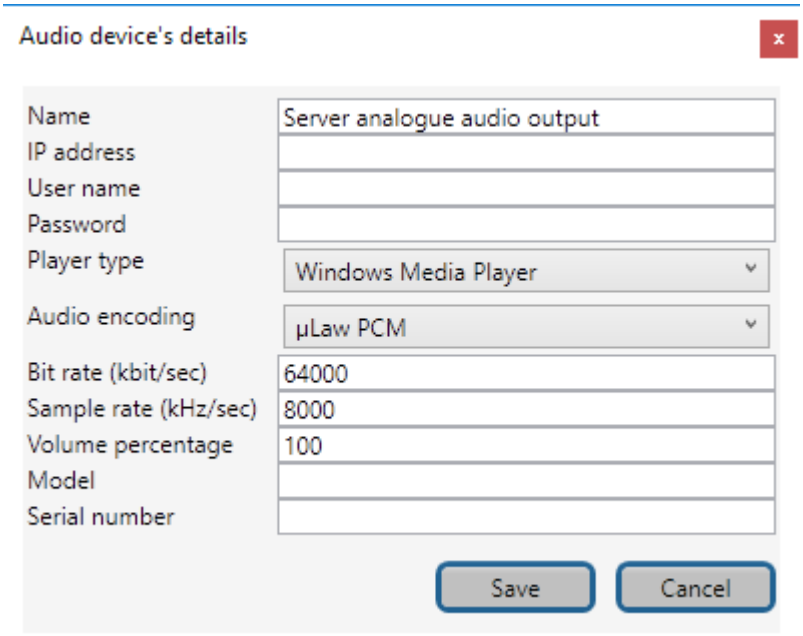
The audio file format is quite limited in the first versions of the system, but will be improved in future releases. We recommend using simple audio editing software such as Audacity for audio format conversions.

To configure an audio device, expand the **Audio devices** section of settings in **Library configuration** tab:



Configuring audio devices in settings

Click on the green plus sign at the right to create a new Audio device.

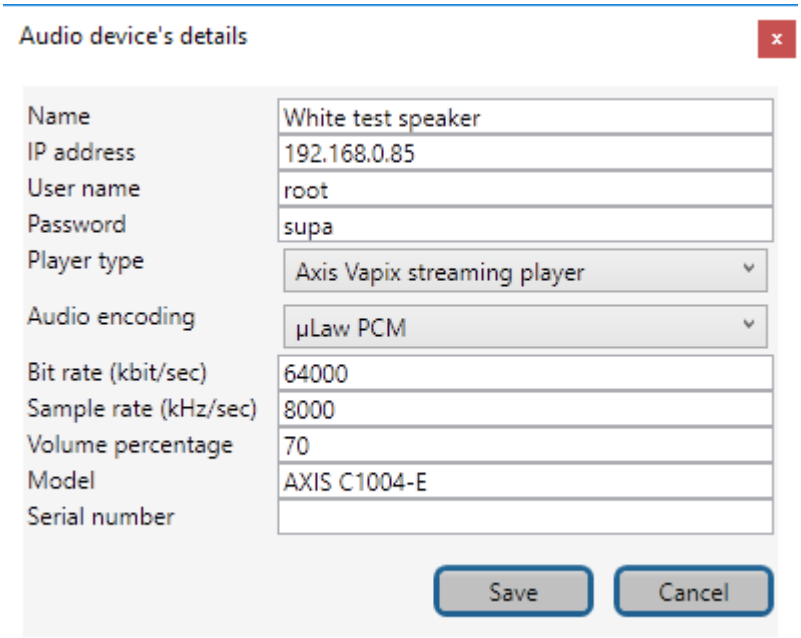


Audio device details

In this example, the audio device is simply Windows Media Player, which means an analogue audio device. Audio files are played through the audio interface of the controller computer, using Windows Media Player.

IMPORTANT NOTE: There is a bug in this dialog which makes an error pop up on saving, if there is nothing in the IP address field. IP address is of course not needed for analogue audio device. As a workaround for the bug, simply enter a space or any other character in the IP address field.

Another possible audio device is an Axis IP speaker. It requires more configuration, namely the IP address, user name and password for access:



Audio device details - Axis Vapix

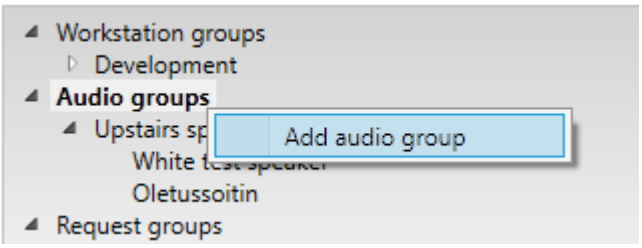
After creating the audio device(s), you need to create Audio groups.

Creating audio groups

An audio group is a group of audio devices, one or more. If using analogue speakers, then most commonly there will be only one audio device in one audio group. If using IP speakers, each speaker is an audio device, and if you wish to play the same audio in many of them, you will add them all to one audio group.

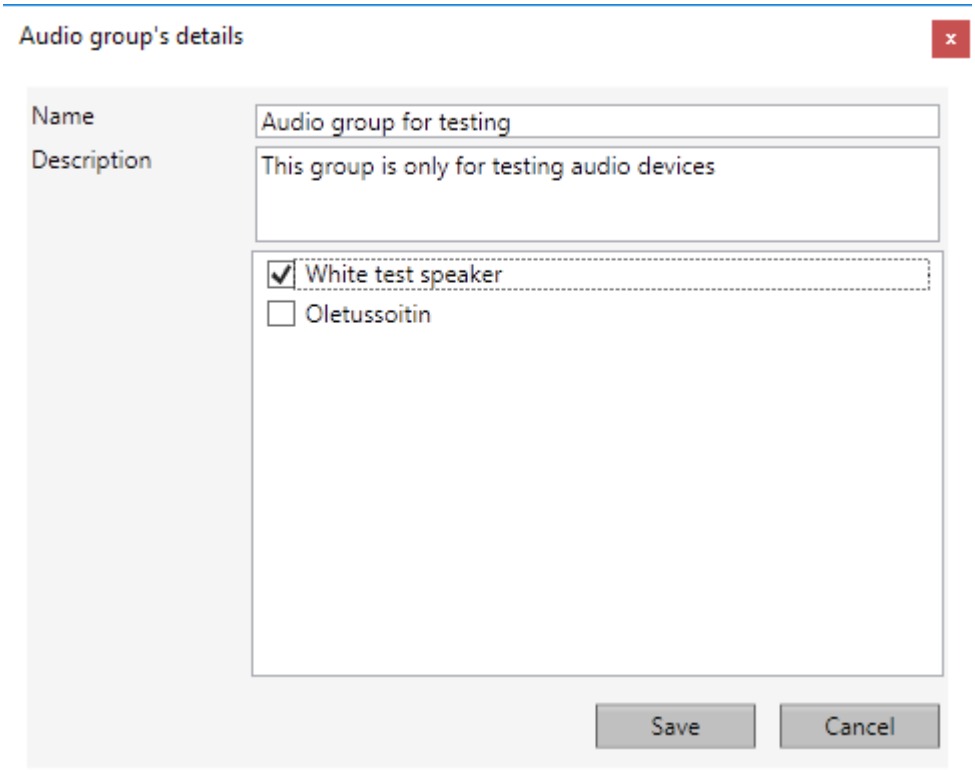
You can also have multiple audio groups, which allows you to play different audio in different parts of a library, at different or same time.

To create an audio group, open the Admin tool from **Schedule editor** page. You need to have the Technician interface selected. Select **Audio groups** from the tree view, right-click on it and select to add an audio group:



Adding audio group

Give the audio group a meaningfull name and description, and select the audio devices that belong to this group:

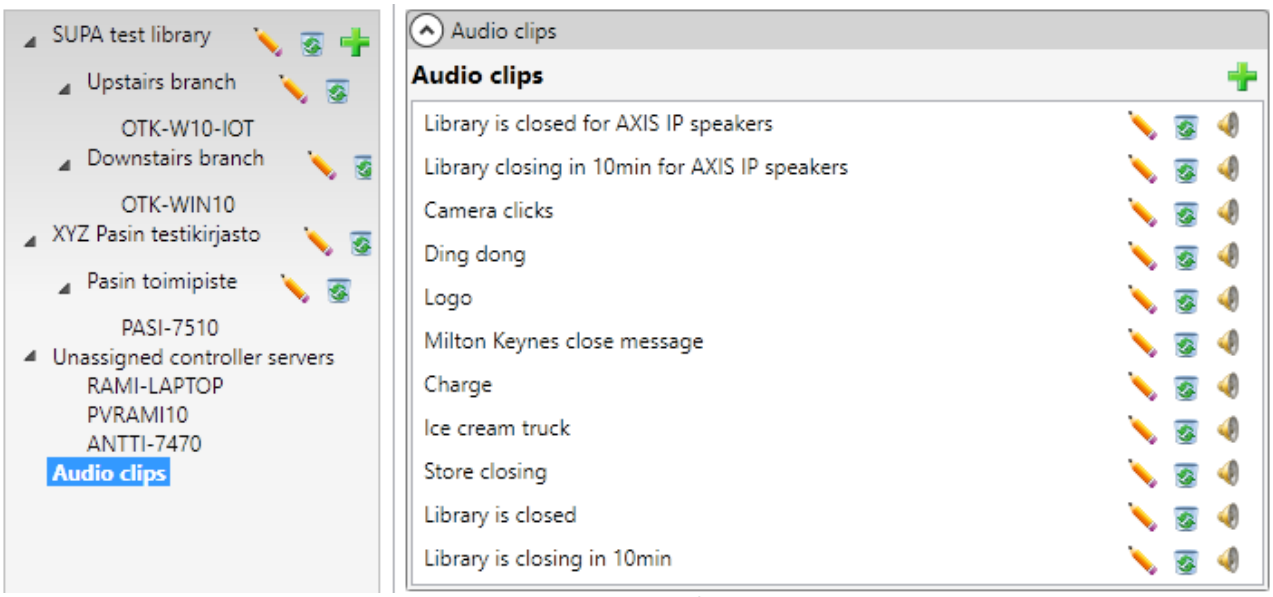


Audio group details

After configuring audio groups device you can upload audio files to the system.

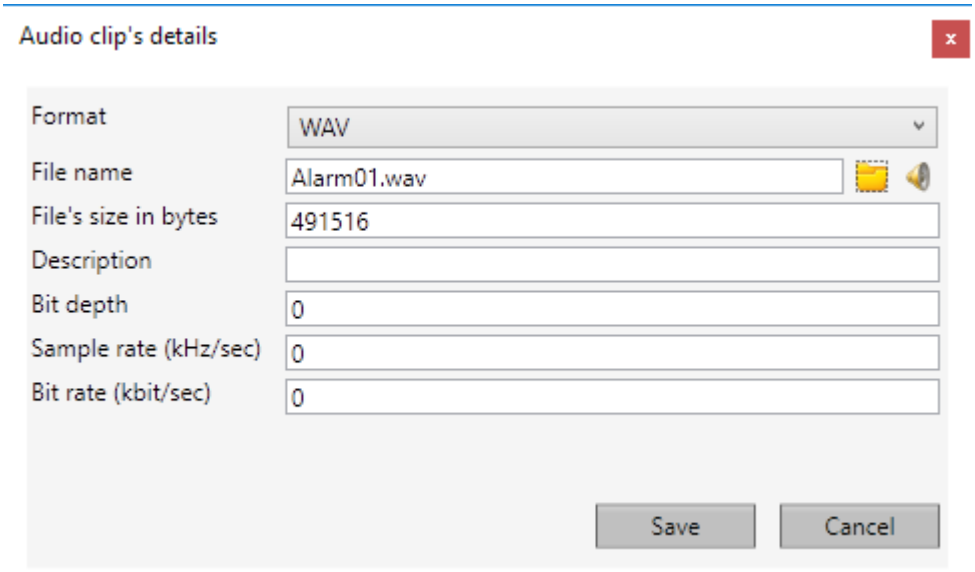
Adding audio files

In **Library configuration** tab of the Admin tool, there is a **Audio clips** root entry. Select it, and in the Audio clips section on the right side, click on the green plus sign to add new audio files:



Uploading audio files

In the upload dialog, browse for the audio file and select the format for it:



Audio clip details

After saving, the audio clip can be used. You can click on the small speaker icon to test playing the audio clip.

The audio clips and audio groups are needed when creating a request group in a schedule; you select an audio group and a clip to play through that group.

Setting up a library schedule

Initial setting up of library schedule takes a bit of time. It is much easier to modify afterwards. This chapter goes through the initial setup and configuration in detail. A simpler instruction of modifying an existing schedule for library staff will be available separately.

A schedule needs to be configured to do something. There are three types of schedule periods:

Closed: library is completely closed of public. Entrance unit will not allow patrons access, unless they are on a specific whitelist.

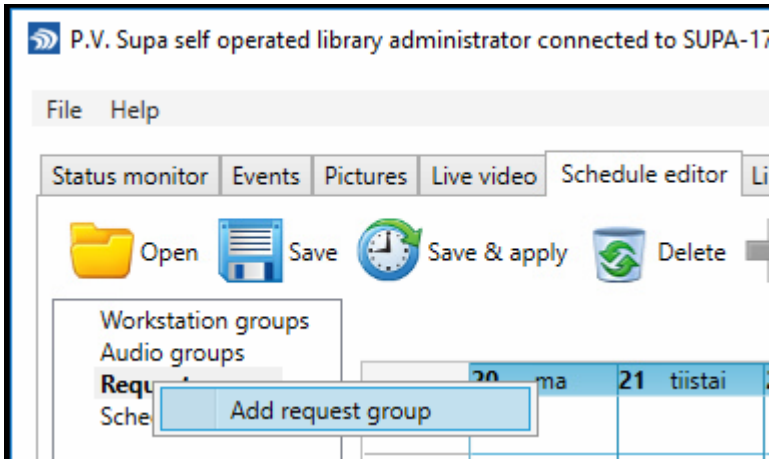
Open: the library is open for public. The entrance unit is not required to enter the library.

Self-operated: library is in self-operated mode. Access is only available by using the entrance unit.

How these all connect to the doors and lights is configured as **Request groups.** Any number of request groups can be created, and any period can be connected to any number of request groups.

Each request group can contain any number of actual events, such as turning on or off lights, starting up or shutting down self-service units, opening or closing door locks and playing audio files.

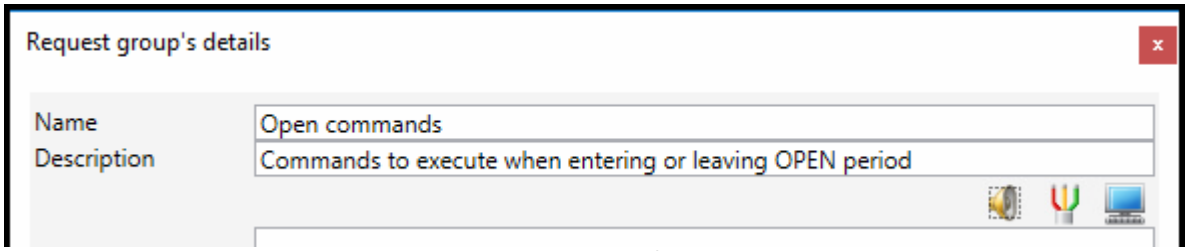
By default three request groups should be created: Open, Closed and Self-operated. To do this, open the **Schedule editor** tab of the Admin tool, select **Request groups** from the list on the left, right-click on it and select **Add request group**. This will bring up a dialog in which any number of requests can be entered to a group:



Adding a new request group

Name the first group "Open commands". This indicates commands to carry out when the library enters (or leaves) **Open** schedule period.

On the top of the dialog to create a request group are three icons:



Request group basic information

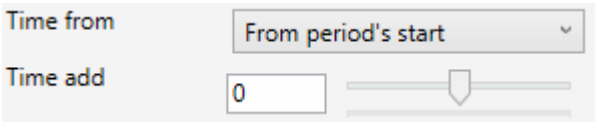
Of these the first one configures an audio file to play, the second one IO commands and the third one workstation requests:

Audio request can contain a single audio file. It has options to choose through which audio group it is played; in case there are multiple IP speakers connected, different audio clips can be played in different parts of the library.

IO request is a command to set or unset, or set for a given time (pulse) any IO channel connected to the IO module. Typically when the library is open for public, the door IO channels are set, opening the locks, and the lights are also turned on. For closed time the opposite would probably be true.

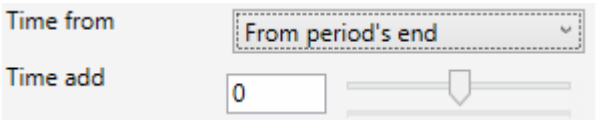
Workstatio request is a request sent to SUPA self service units, to either shut down or start up. Shut down requires that some Supa software is running, such as Librid or Libretto, which can receive the request and perform the shutdown. Starting up is done by sending a Wake-on-Lan packet over the network.

Any request can be set to happen at the time when a period starts, or when a period ends. There is also a variable to set minutes of before or after that specific point in time, thus:



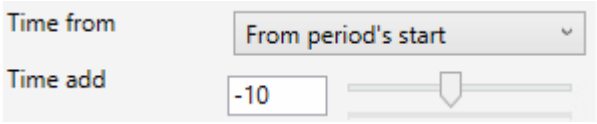
Request at period start exactly

This would make the request execute exatcly at the time when the period starts.



Request at period end exactly

This would make the request execute when the period ends.

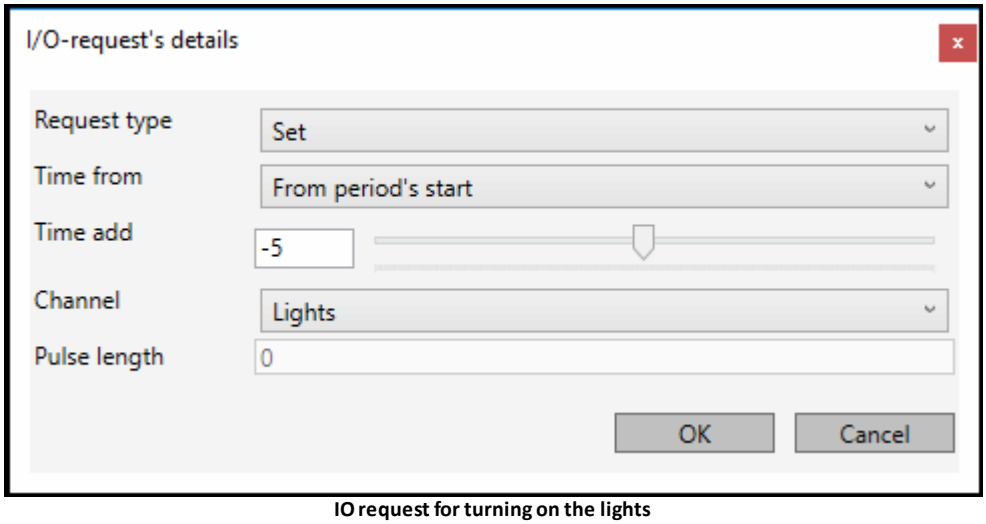


Request 10 minutes before start

While this would make a request execute 10 minutes before a period starts; for example turning on self-service units (workstation request) would probably be sent like this, to make sure the machines have enough time to start up, before the library opens.

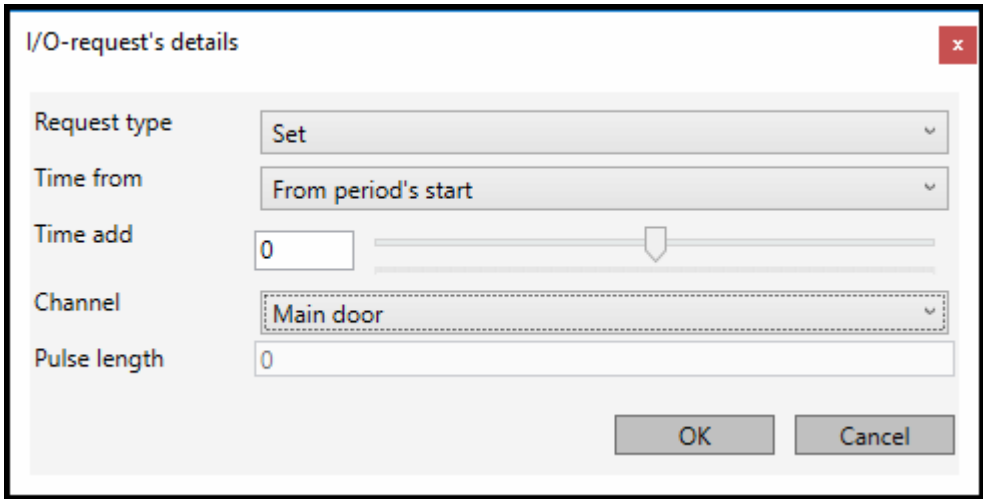
Important! It is possible to make requests too complex and even contradictory. Pay attention to what happens, and use the **Preview** button at the top of the schedule view to look at what requests will actually be sent at what times, to prevent accidentaly creating an unwanted combination.

For now, create a request group for Open period to turn on the lights five minutes before starting the open time, and open the doors at exactly the time when the library opens:



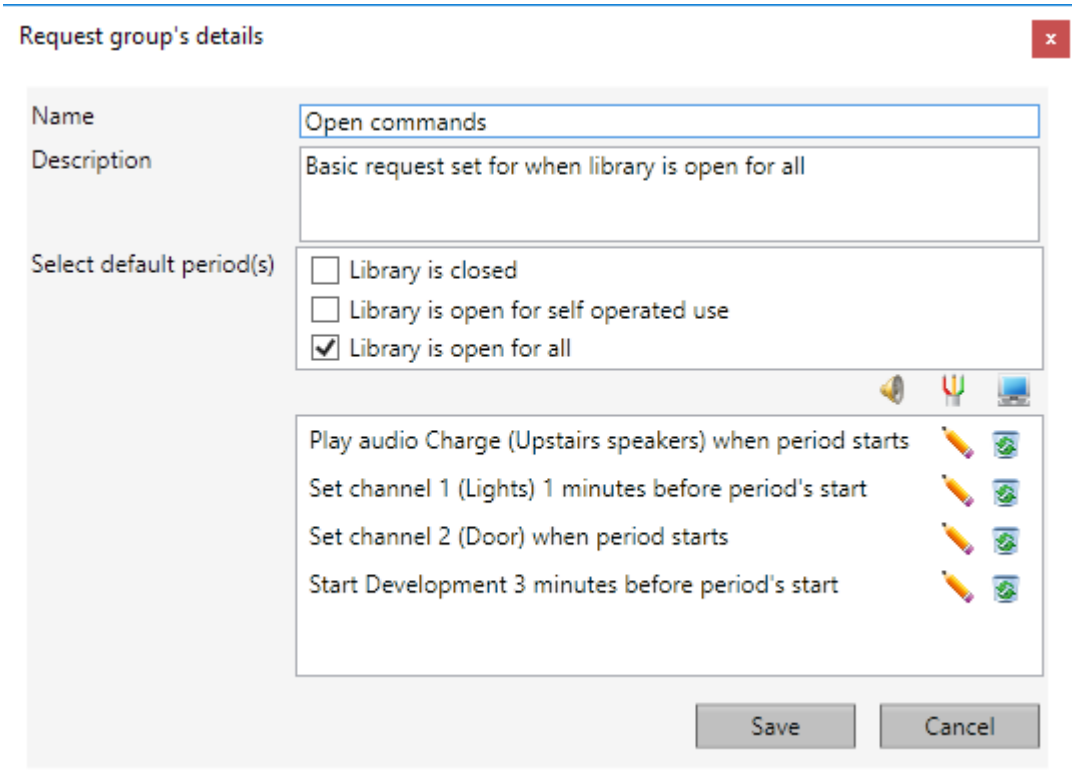
IO request for turning on the lights

This request will set channel "Lights" (named earlier! it is actually channel 5, or 4 in Omron IO channel counts) at -5 minutes from the period start. Thus, in human language, that means "five minutes before entering the Open period, turn on lights". Next up, the door locks:



IO request for opening door

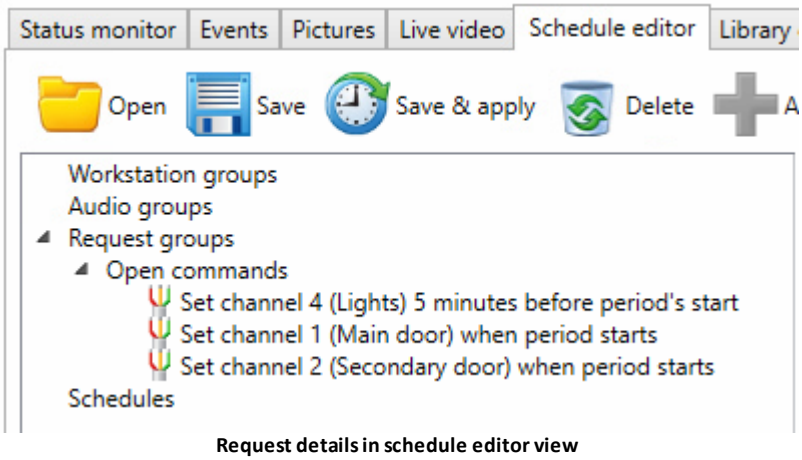
This would open the channel "Main door" at precisely the time when the period begins. Do the same for the secondary door channel, and the end result should look like this in the request group details:



Request group details

Remember to select the default period to which this group should be connected; this helps making the schedule periods as the group is then already filled.

And it should be as follows in the schedule editor:

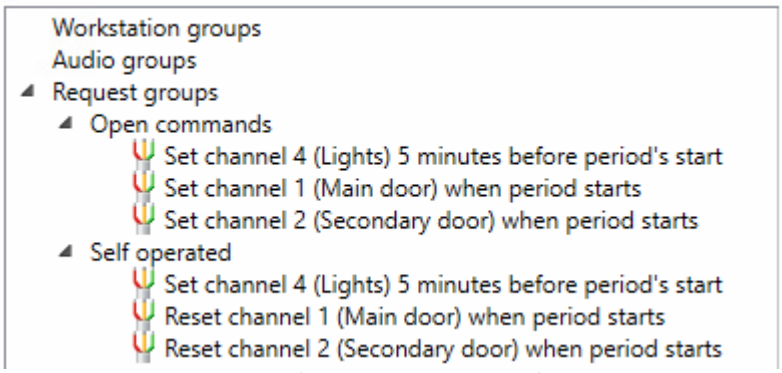


Request details in schedule editor view

This seems like a lot to do, but the idea behind building the actions this way is flexibility. It is possible to make very complex systems function automatically using this method.

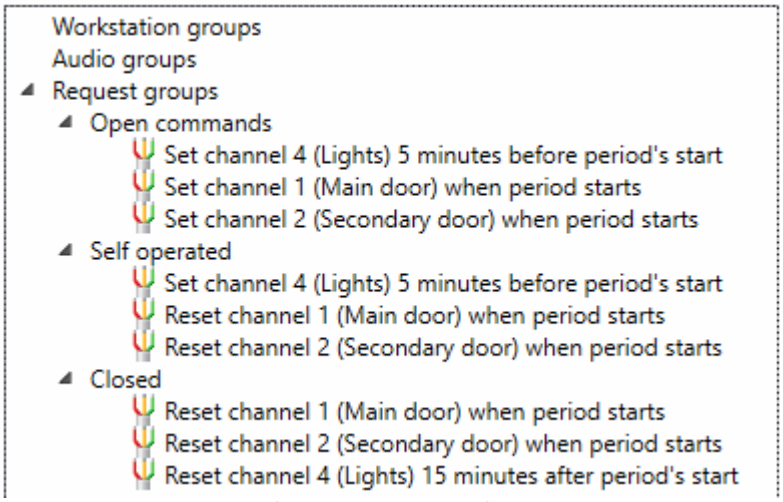
Next, create actions to close (reset) the door locks when library enters Self operated (Unmanned) period. It should also turn on the lights - it does not matter if the period comes after an Open period and the lights are already on, but this allows the lights to turn on even if the Self operated

period is started immediately after a Closed period when the lights would be closed. It should look like this:



Open and self operated commands configured

You can see here the commands to **Reset** given channels when entering this period. Then the only thing left is to configure the Closed period. Let's make it close the locks immediately, and turn off lights 15 minutes after entering the period. That should give people enough time to exit the library:



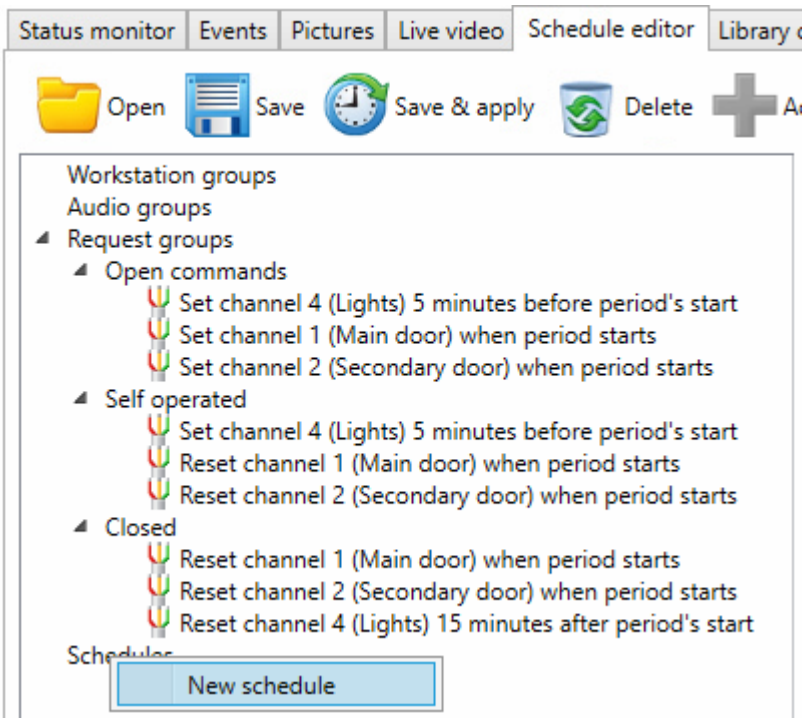
Request groups for open closed and self operated periods

These groups only contain the IO commands. Normally, you would want to start up computers and play audion requests; configuring those is covered later on in this manual. For now, continue to create an actual schedule.

Create a schedule

A schedule is a set of periods over a week. There can be many schedules created, but only one is active at any given time. This allows separate schedules to be created for holiday seasons, for example, and then just activated for that time.

To create a schedule, right-click on the **Schedules** entry in the schedule editor view and select **New schedule:**

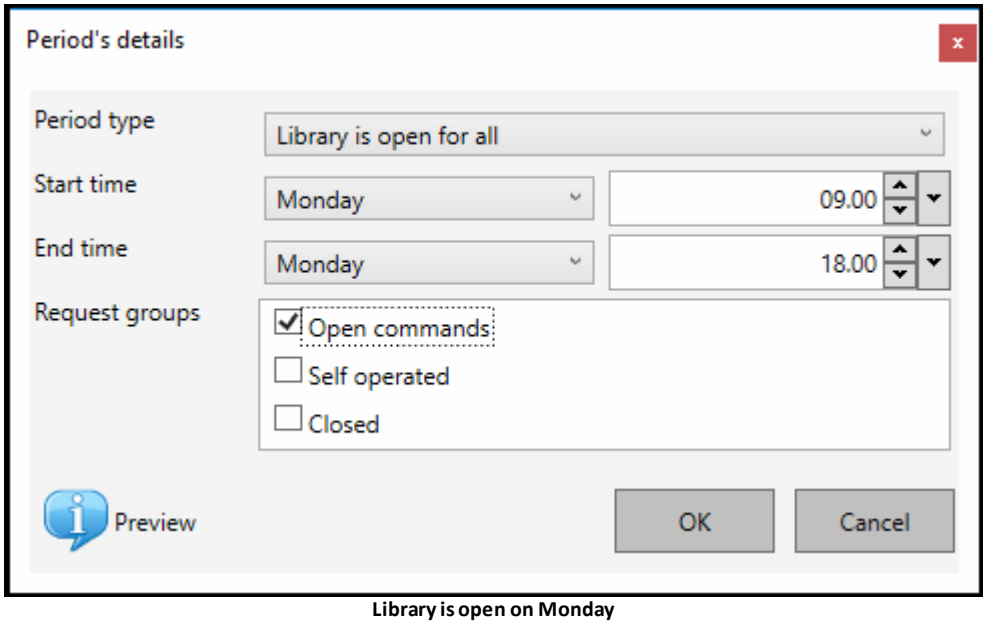


Creating a new schedule

You'll need to give the new schedule a name, and it is also advisable to give it a description in case there will be multiple schedules in the system.

Pay attention to marking the schedule active: once this is selected, this schedule will be made active and all requests including IO commands will begin to get sent.

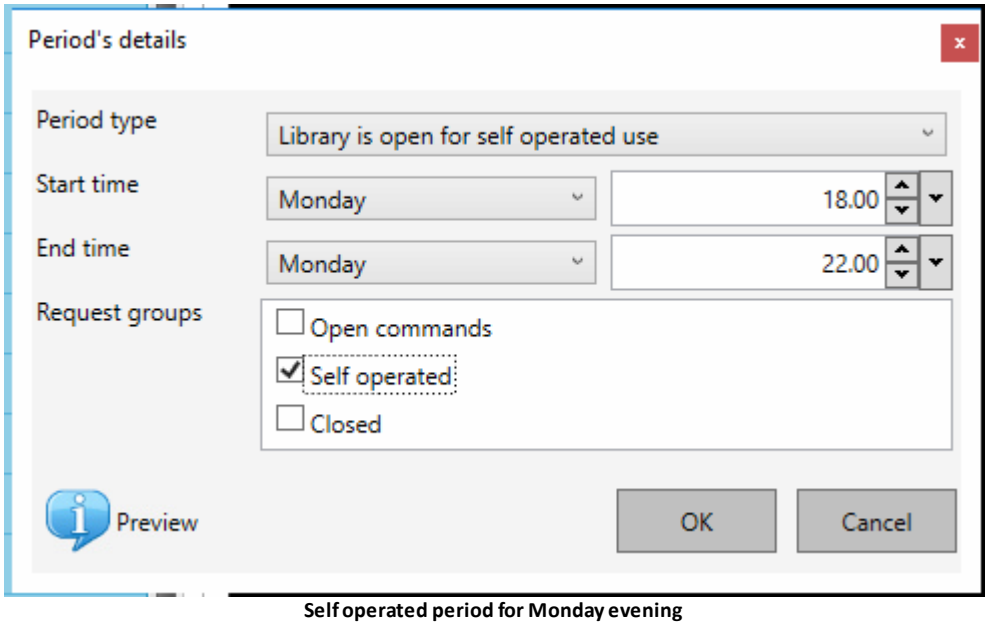
When a schedule is created, you can add schedule periods to it by pressing the **Add schedule period** button (green plus sign) above the schedule. This brings up a dialog. Let's make the library be open from Monday morning 09:00 until 18:00 :



Library is open on Monday

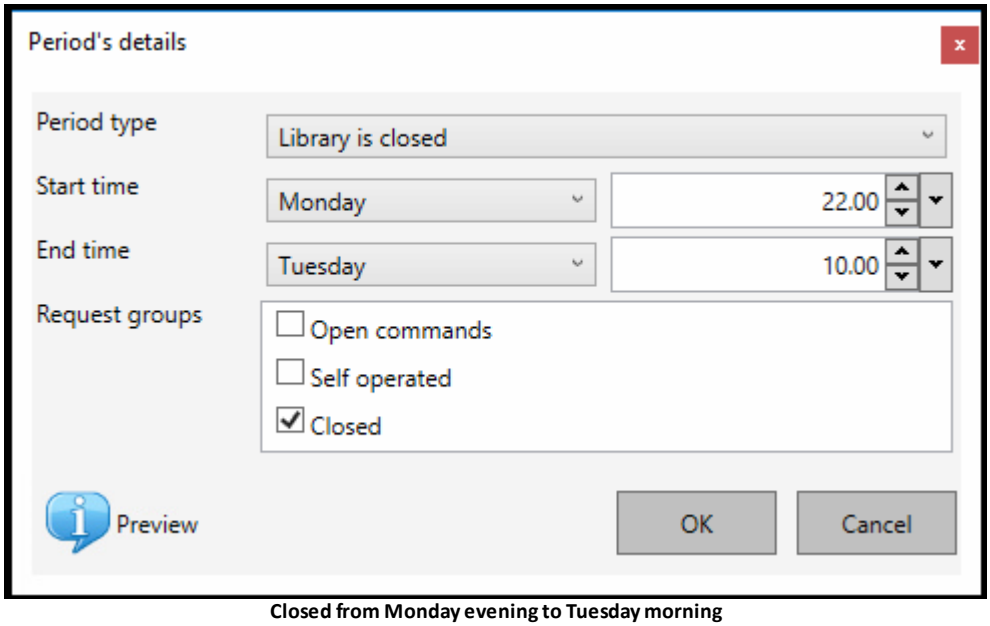
It is important to select what Request groups are tied to this period. This system makes it possible to design *different types of Open periods*, or any other periods, if needed. For example a self operated period could be different on weekends, only turning on some lights, opening only some self service units and some door locks - and then on weekdays it could allow more extensive use of a library, by opening more things.

After accepting this period it will become visible in the calendar view. Let's create another one, let's make the library self operated for the Monday evening, say, until 22:00 :



Self operated period for Monday evening

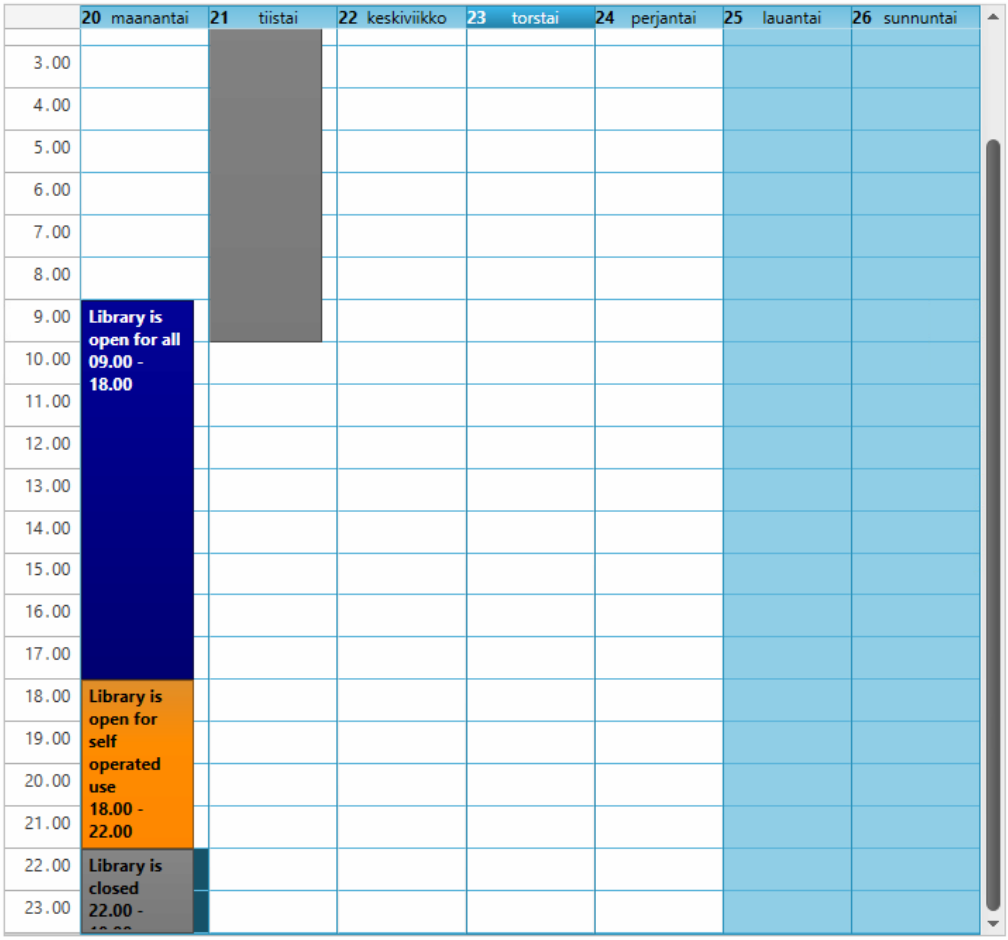
After that, the library should be closed until Tuesday morning, 10:00 :



Closed from Monday evening to Tuesday morning

After these your schedule should contain three periods, one of each available type, and look like this:

Default (Default schedule for the library) - schedule is in use

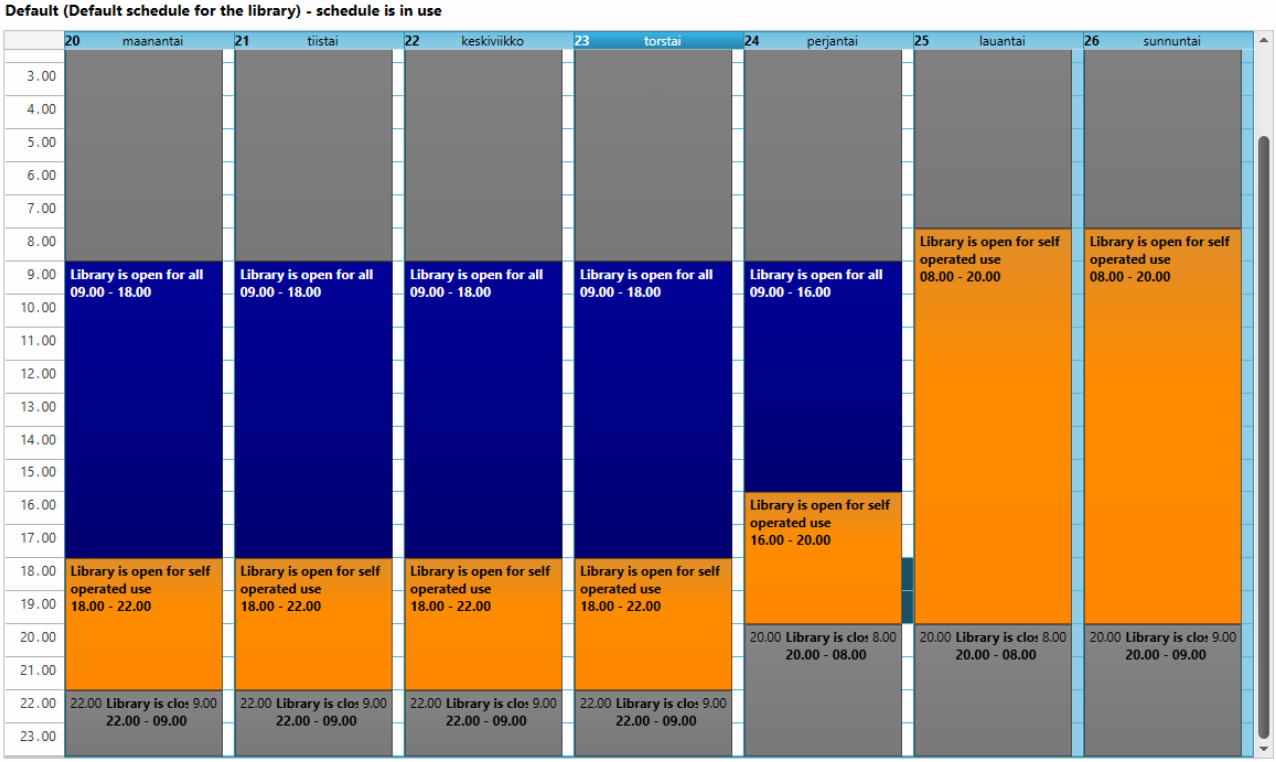


Default schedule - Monday done, Tuesday next

As you can see, periods can extend over midnight to two days, and in fact even further. You can make the library close from Friday evening to Monday morning using a single Closed period.

After creating the whole schedule as you wish, press the **Save and apply** button (clock icon) on top of the schedule view, to make an active schedule reload in all controllers. You should now be able to see in the IO module, the led indicators turn on and off based on the schedule.

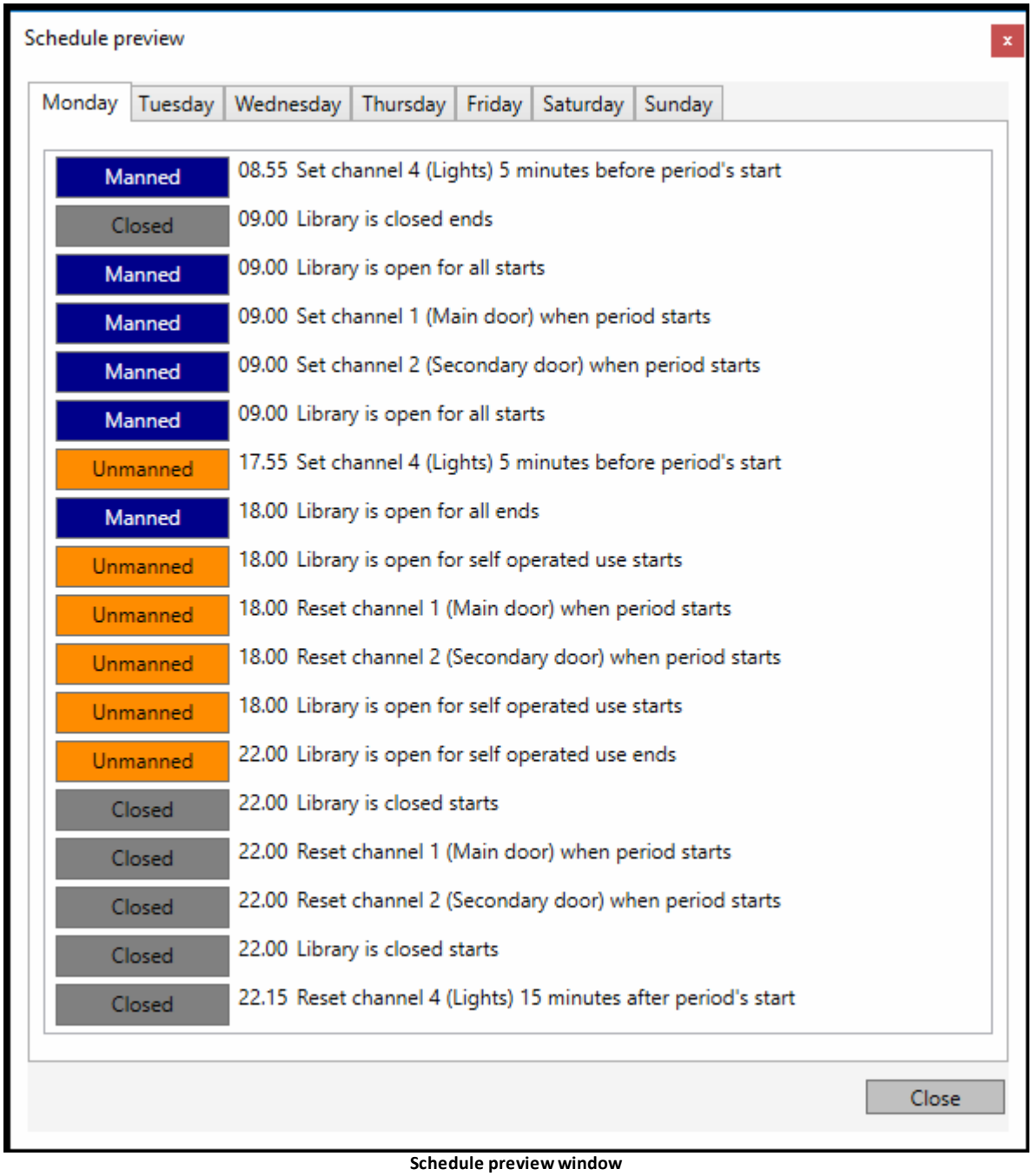
The end result might look like this:



Full weekly schedule

There are shortcuts available in a context menu. Right-click on a period to copy it to next or previous days, for example. You can create one day and then copy the periods from that to the following days, to create a schedule very quickly. You can also paint an empty area from the schedule, right-click on it and select to create a period there, which will automatically use the selected day and timespan from the painted area.

Once a schedule has been created it is a good idea to check the commands that will be sent. Click on the **Preview** button above the schedule. This view lists all commands that will be sent, and on which day and time they will be sent. The color coding makes it easier to follow from which reason a command is sent:



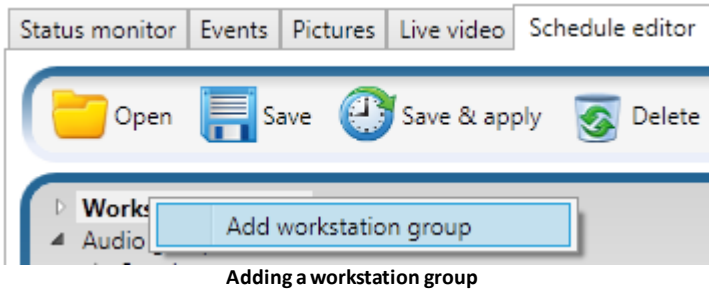
Schedule preview window

In the example above, you can see that at 09:00 the Closed period ends. Five minutes before that, a blue marker ("Manned") indicates a command that belongs to that period. That is the "Turn on lights five minutes before opening the library" request that we defined earlier. This view allows you to make sure that all commands are in their correct places.

Creating workstation groups

Workstation groups are sets of computers running Supa self-service software, such as Librid (check out machine) or Libretto (sorter) software. Groups are created to control a number of these devices as one. Typically in a small library, all devices can belong to a single group. On a larger system, several groups can be defined with different machines. This allows parts of a library to be controlled separately from each other. For example, self operated library could only allow part of a library to be used, and a group of machines of that part could be started automatically when other machines are shut down.

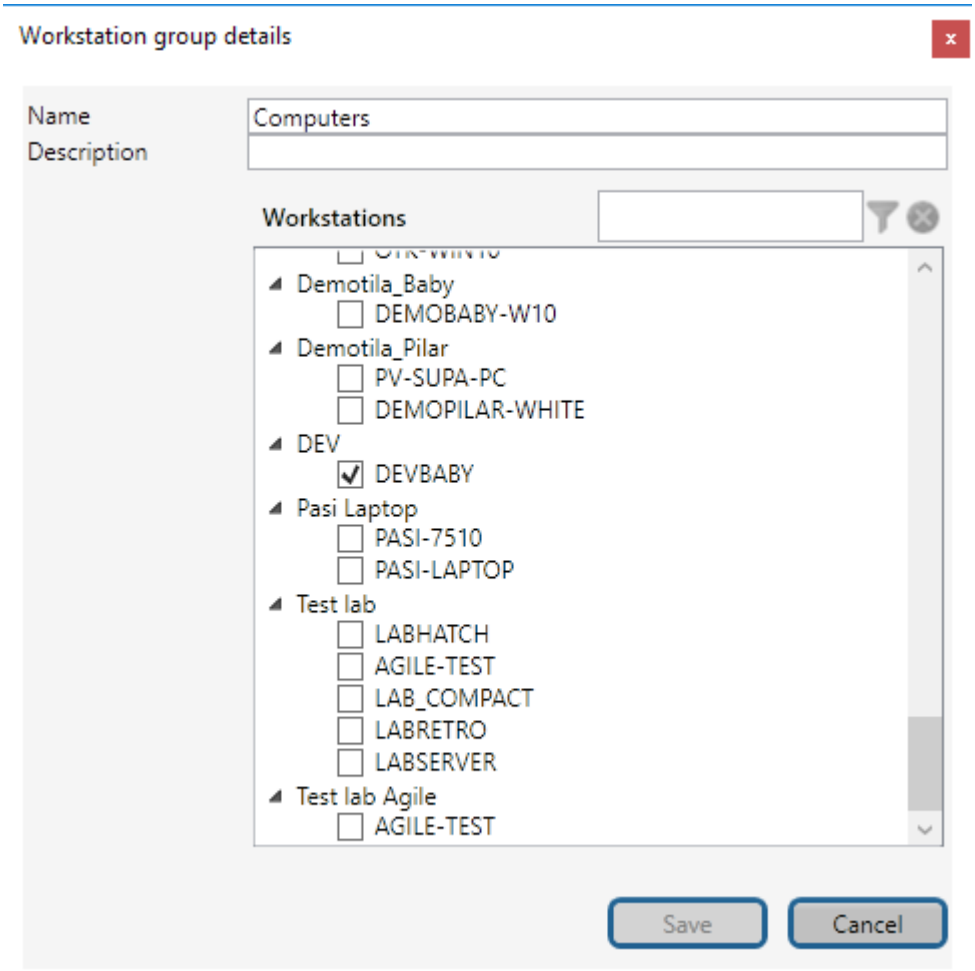
To create a group, select **Workstation groups** in the schedule editor, right-click on it and select **Add workstation group**.



Adding a workstation group

In the dialog that opens, select the machines you want included in this group. Only machines that have been logged in to Master controller database are visible. That means, if you install a new machine or change a computer name on an existing device, you will need to select that machine to a group after that.

The dialog shows all known computers with Supa software running, connected to the same Master controller instance as the self operated library controller:



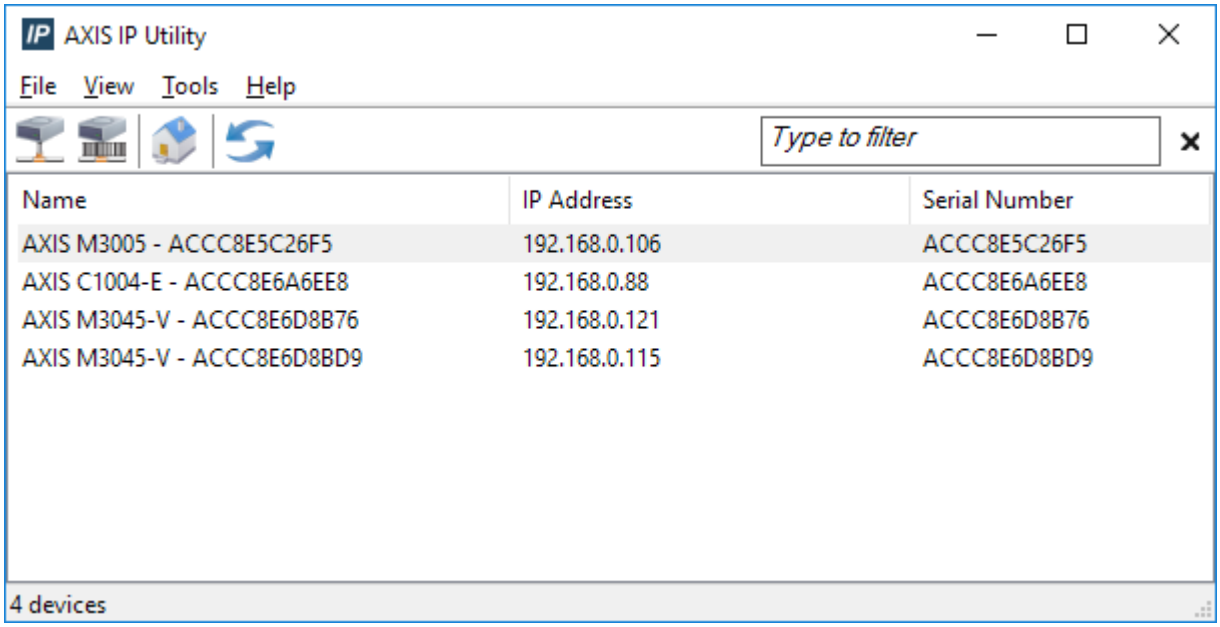
Selecting devices to a workstation group

Give the group a name and optionally a description, mark the devices in the dialog and click **Save** to include them in the group. You can create several groups if needed, and edit the details of any group at any time by right-clicking a group name in the Workstation groups section of the schedule tree view.

Configuring IP cameras

Basic configuration to be carried out is to give a user name and password combination to each camera, and then configra the camera triggers and picture options, and finally set the FTP to correctly store the pictures on the self operated library controller.

The passwords for cameras can be configured via the built-in web application in each camera. To open the web application, you need to first find the IP address of the speakers. This can be achieved using the Axis IPUtility tool:

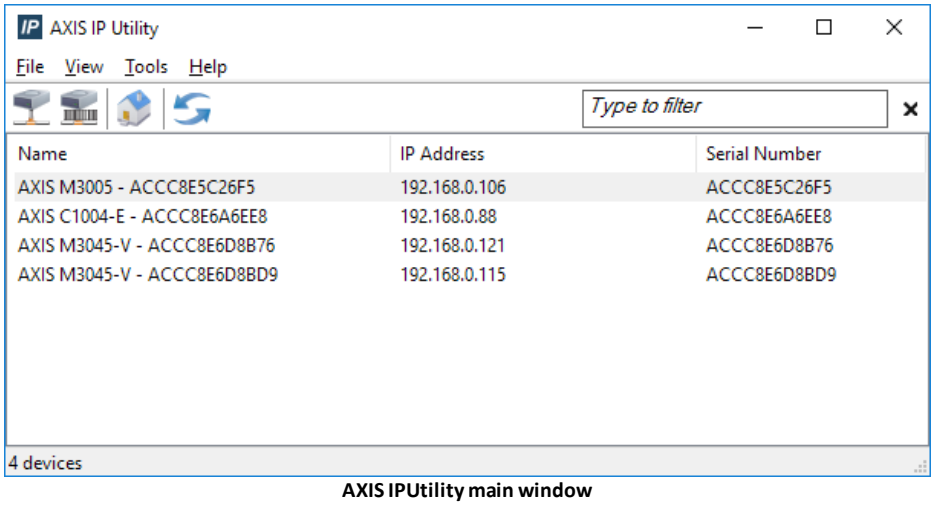


It is also possible to set the IP address of your computer to match the address space of the default IP settings of a camera, and connect it directly to the computer. By default, the Axis cameras typically have an address 192.168.0.90 . Using the AXIS IP Utility is simpler as the cameras can be connected to an internal network directly.

Configuring IP speakers

Axis IP speakers must be configured to use the correct audio file format, before they can be used. At the moment the only G711 u-law encoding is supported.

Basic configuration to be carried out is to give a user name and password combination to each speaker. These can only be configured via the built-in web application. To open the web application, you need to first find the IP address of the speakers. This can be achieved using the Axis IPUtility tool:

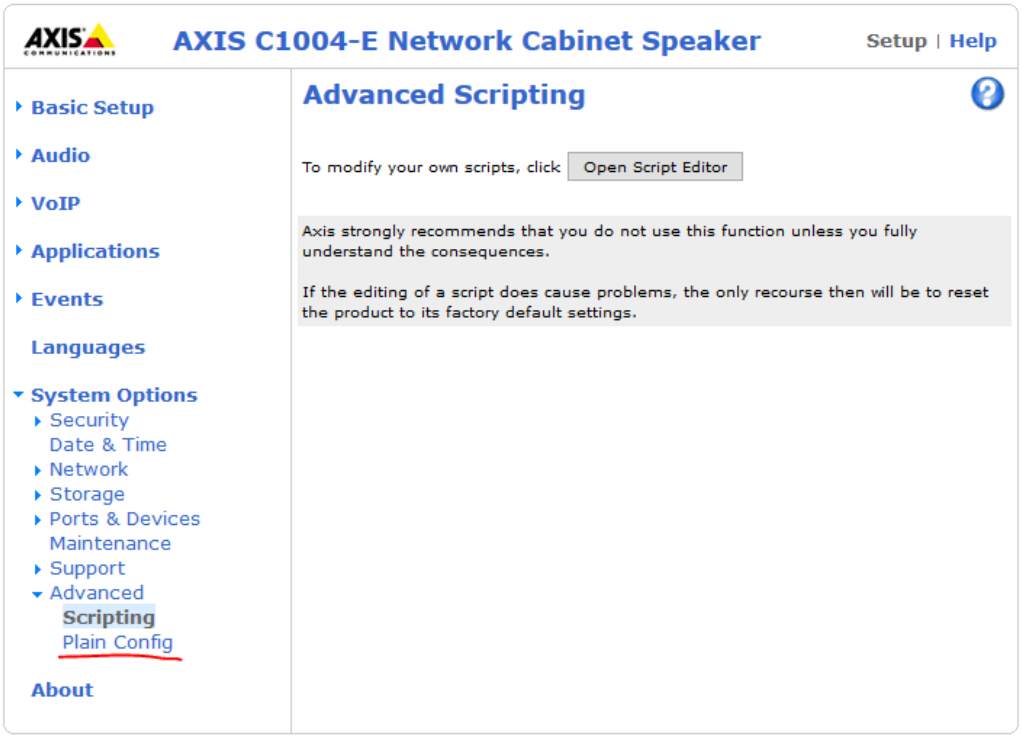


AXIS IPUtility main window

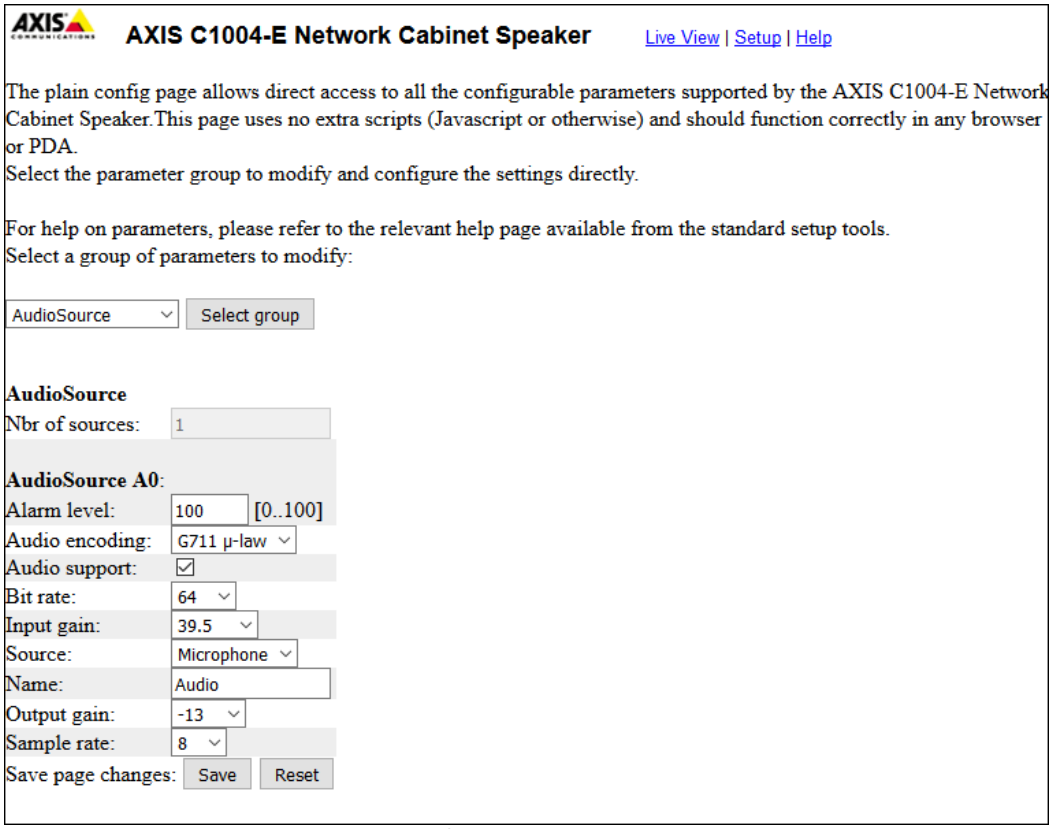
This tool lists all Axis devices - IP speakers and cameras - and displays their type. In the image above, there is only one IP speaker, model C1004-E, and three Axis cameras connected to the network. By default the speakers and cameras have a dynamic IP address assigned by DHCP, and they can be connected by double-clicking on the device on this tool. On first access, the root login

password needs to be given. Please make a note of the password as it cannot be recovered, only reset to factory defaults in which case other settings will be reset as well.

The actual audio configuration can be done using the built-in web application of the speaker and opening the Plain Config / AudioSource configuration section:



IP speaker configuration - main menu

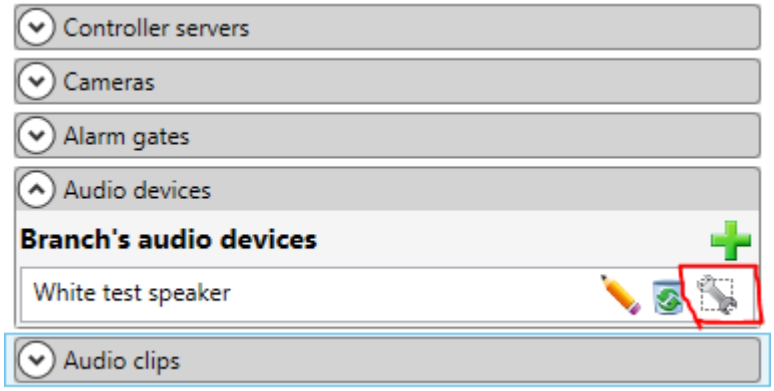


IP speaker configuration - AudioSource settings

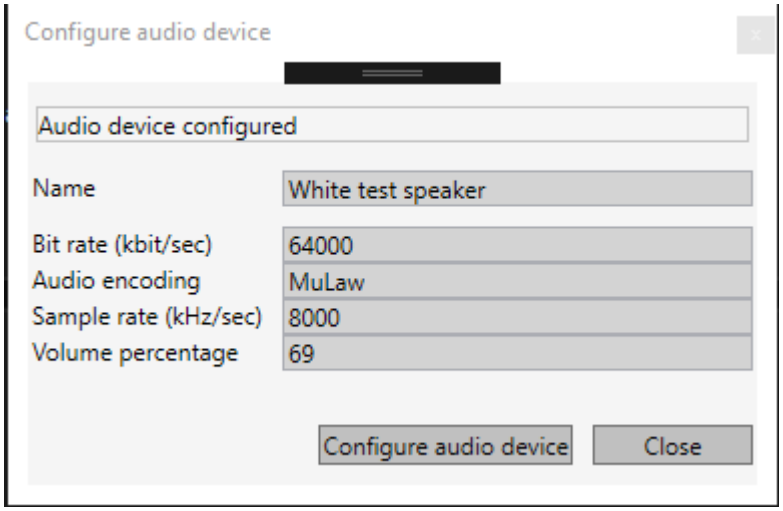
The important settings to make sure are set, are:

- Audio encoding must be "G711 u-law"
- Bit rate must be 64
- Sample rate must be 8

An easier method of configuring the speakers is selecting them to a branch in SOL Administrator and then opening settings of a speaker:



After selecting the settings of a speaker, a configuration window opens:



In this window you can simply press the "Configure audio device" button, and the correct configuration will be sent to the speaker, if it is connected and reachable in the network.

Scheduler

At the core of everything automatic of the self operated library is the scheduler. This is what makes things happen on time without manual intervention from the users.

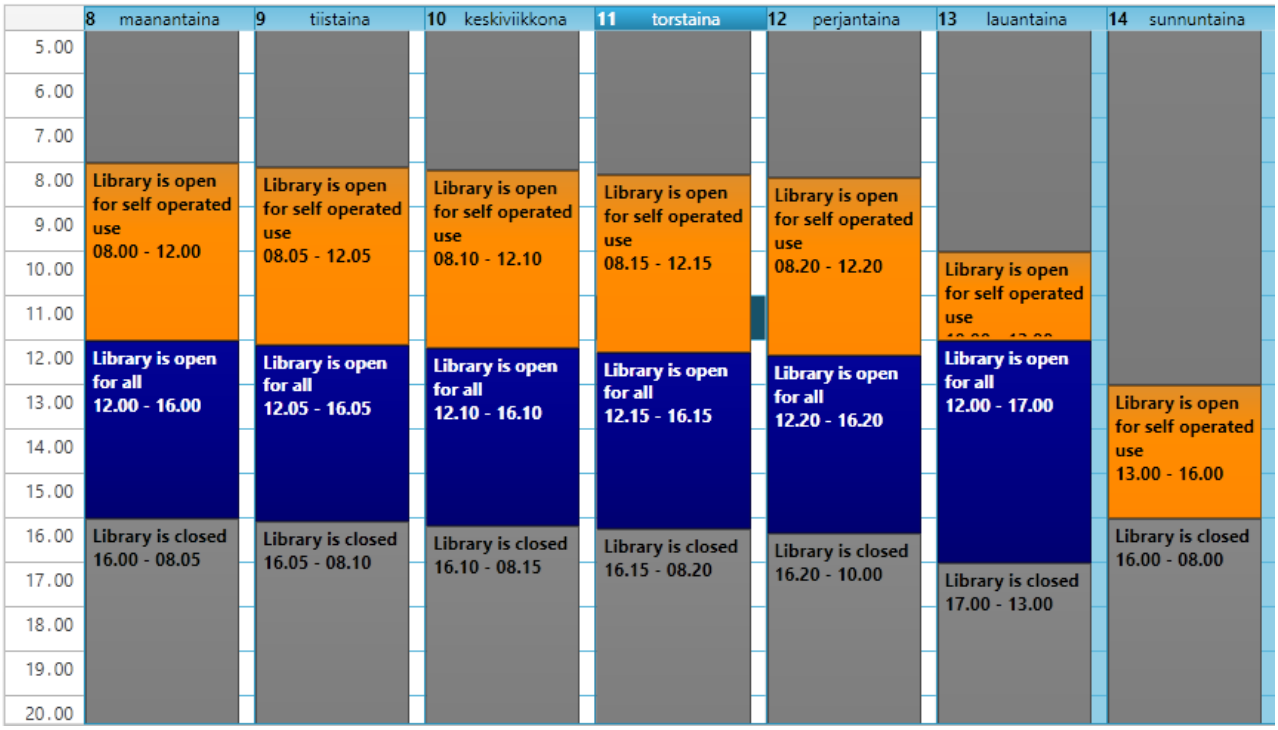
This chapter explains how the scheduler works, what are requests and request groups, schedule periods and exceptions.

The schedule is operated by the Self Operated Library Controller (SOL controller) service. It is vital that this service is installed on a server machine that is never turned off. Because the SOL controller also operates the IO - lights, doors, alarm systems - it should also be covered by an UPS system to prevent power loss from interrupting normal operations.

A schedule is what drives the events in a library. There can be many schedules in a library, but only one schedule is active at any given time for a library branch. For example, there could be two schedules; one for regular times, and one for holiday seasons when the library is more open in self operated mode, and less in manned mode. Then when a holiday season begins, the library can easily just switch to the holiday season schedule.

It is also possible to design a new schedule; keeping it inactive means it can be saved and worked on while the regular schedule is still in use.

A very simple schedule might look like this:



Example of a very simple schedule

The colors indicate different schedule periods; this concept will be explained in more detail in the next chapter.

Understanding requests, request groups and schedule periods

A **Schedule** is a 7-day time period which repeats automatically until it is specifically stopped or altered. The schedule contains a freely defined number of schedule periods.

Schedule period is a time period in the weekly calendar. It has a start and an end; they can be within the same day or they can span over to multiple days. For example, a library is likely to be closed from evening to the next morning; this would mean a period that starts in evening and ends the following morning. The period can also run over the end of week to beginning of next week; a library can be closed from sunday evening to monday morning.

Each schedule period has a type. There are three types of periods: Open (also referred to as Manned), Closed and Self operated. This indicates in which *mode* the library is on. These are pre-defined and can not be altered. It is however possible to define several request groups that are of the same type but have different request; thus, the library can be open in different ways. This is controlled by request groups, which in turn are made of requests.

A **Request** in this context is a request made by the system to other components in the system. A request can be an IO-request to turn on lights or open a door, an audio request to play an audio announcement, or a workstation request to start or shut down computers running self service software. These requests are grouped together to form request groups so that controlling all that happens when a library opens is tied together.

Request group is simply a group of requests that happen together. The requests are connected to schedule periods; either the start or end of a period. A time delta value can be given in minutes, for example to turn on lights 15 minutes before the period "Open" begins.

Grouping requests and connecting them to periods means that altering a period in a calendar will "take with it" all the requests, and their timing. This makes it extremely easy to change any period in a schedule. If a request is tied to "Open" period saying the lights should be turned on 15 minutes before the period starts, then changing the time when the "Open" period begins - dragging the period in the calendar - will make the lights turn on 15 minutes before that time, regardless of what that time eventually is.

IMPORTANT NOTE: With this flexibility comes also some complexity. It is possible to create request groups that lead to unintended results. For example, if you make a request to turn on lights 15 minutes before "Open" period, and another one to turn off lights half an hour *after* "Closed" period ends, this will cause a problem if you create a short, half an hour closed period like a lunch break. Because, say that

At 12:00, Closed period ends and Open period begins

At 15:00, the library closes for half an hour

At 15:30 the library opens again.

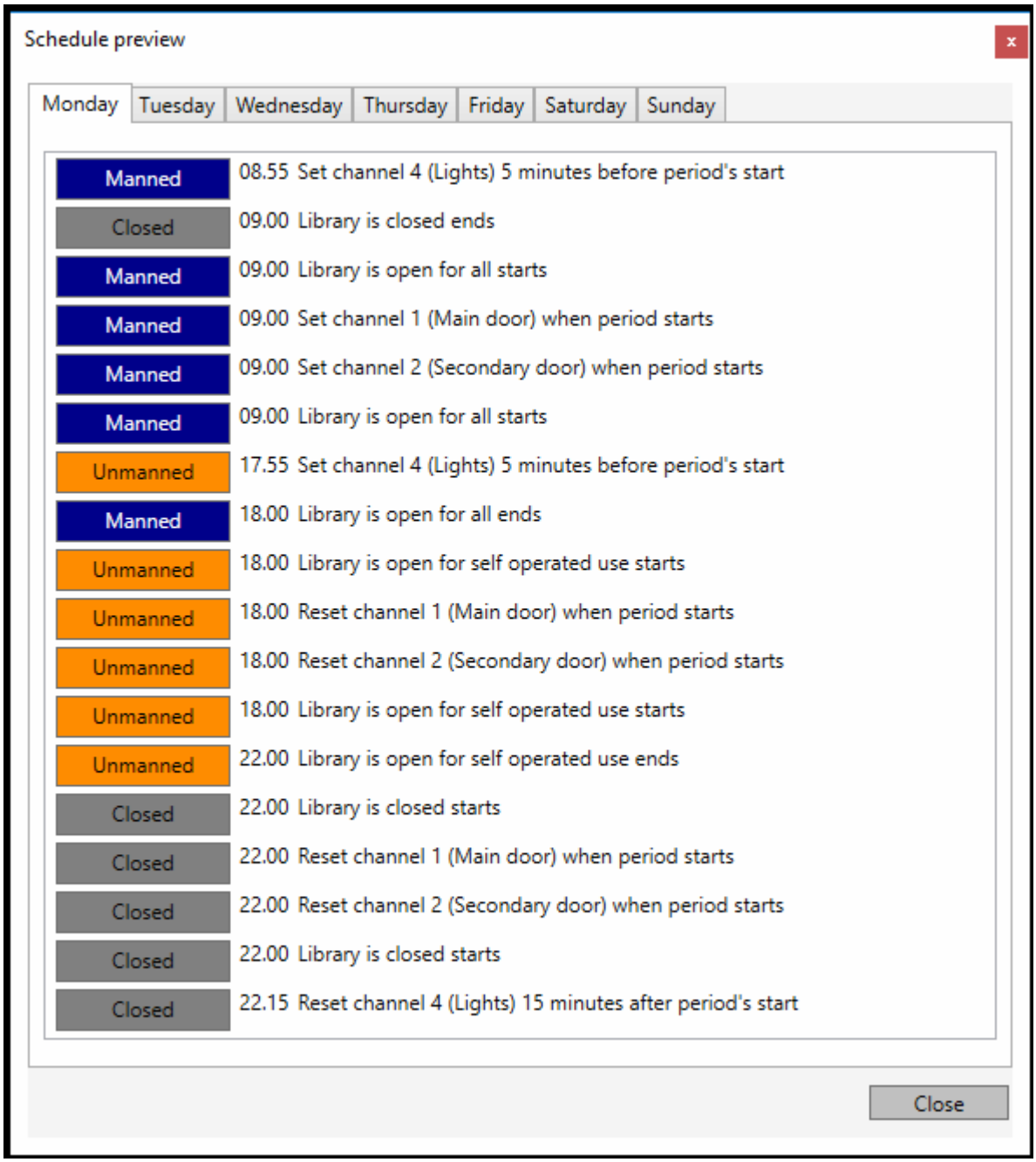
This means, that at 11:45 the request connected to Open period turns the lights on. All is well so far.

At 15:00 the library closes. Lights are set to turn off half an hour later, at 15:30

At 15:15, the lights will be turned on because the Open period requests it to happen 15 minutes before starting.

At 15:30 the library opens - and at the same time, the lights go out! This is because the Closed request is now half an hour ago, and it closes the lights.

It is important to be carefull. We recommend only using period start as the anchor of events if at all possible. There is also a "Preview" button available the SOL Administrator software which displays all requests as they happen, making it easier to see possible conflicts.



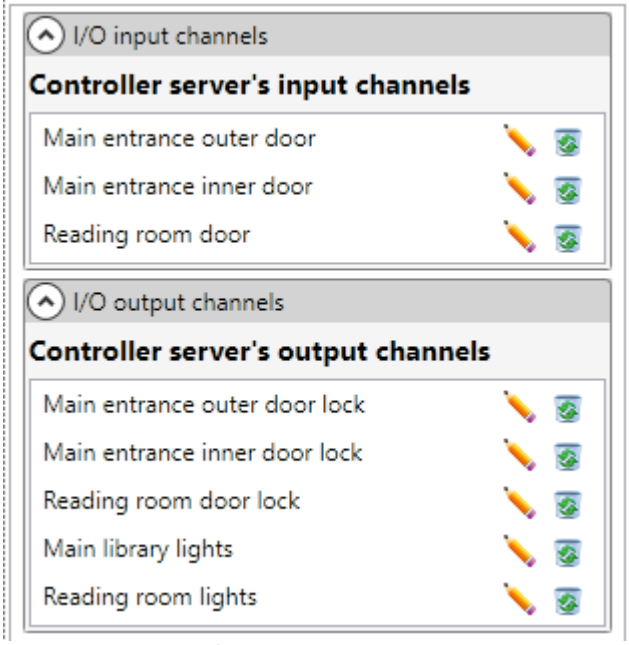
Schedule preview sample

More on request groups

Typically there would be only three request groups: one for when the library is closed, one for when it is open for public and one for when it is in self operated mode. It is however possible to define more groups, for example there can be different types of self operated modes.

One such scenario could be that the library is open in either full self operated mode, people having access to all of the library, while another request group could only open doors and turn on lights to a reading room. These could both be self service times, but with different IO request made.

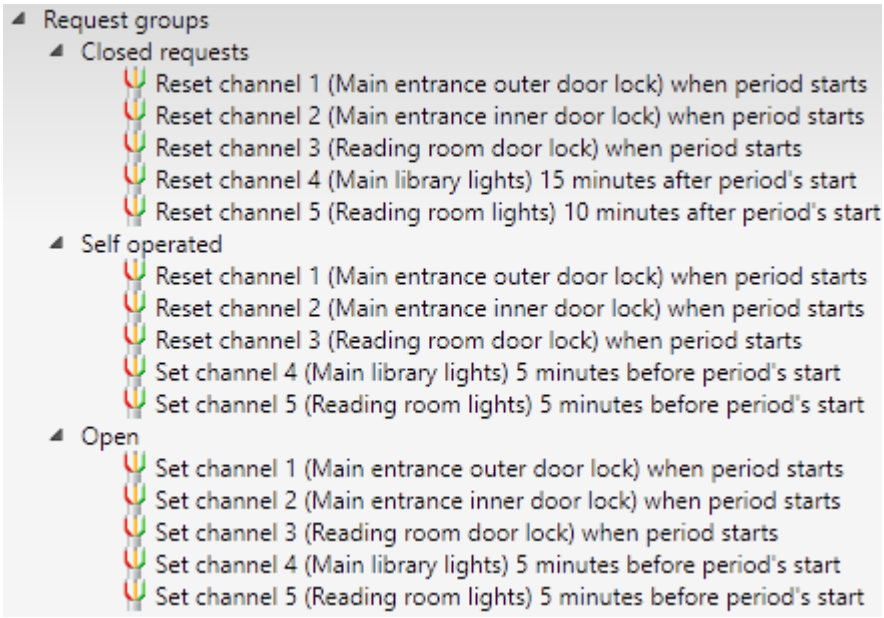
Naming the IO channels clearly will make this quite easy to do. For example, let's look at a basic starting point where the library has a simple setup of only one self operated request group. This library has separate lights and door for a reading room, the IO is named as follows:



Sample IO settings for a library with a separate reading room

The input channels refer to incoming signals that can be monitored. If these signals are marked to be of type Door, alarms can be sent if they are detected to be open for longer than a give time - that would indicate that someone has perhaps gained entry and blocked the door from fully closing. It is not mandatory to use inputs and if no sensors are available these can be ignored, but for this example each door has a sensor.

This library could have the following request groups configured:

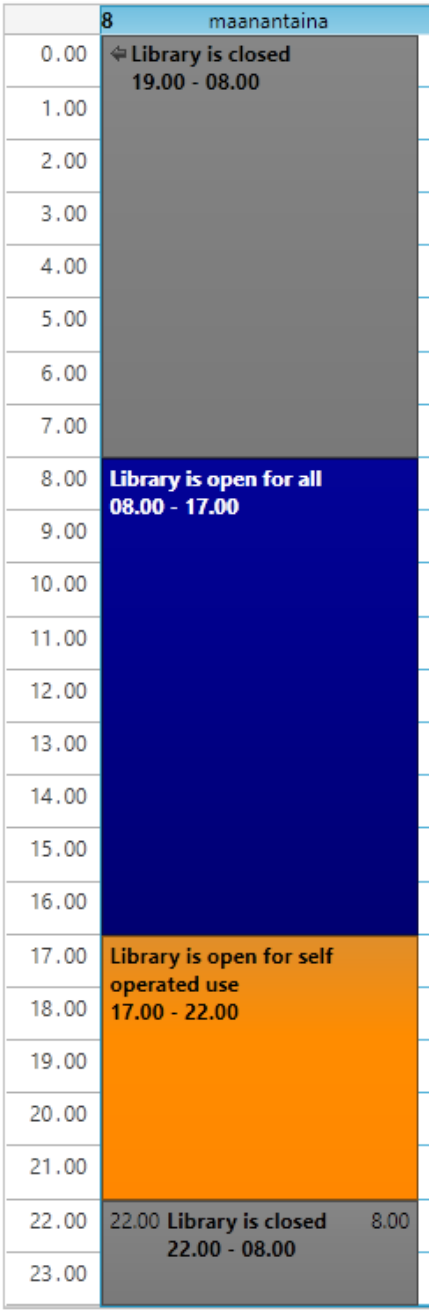


Sample requests for a simple library with reading room

In short, when the library is closed all locks are closed and all lights are turned off. When the library is open, all locks are open and all lights are on. When the library is in self operated mode, all locks are closed but all lights are on. This is a fairly typical scenario. Notice, that when the library is closed, the lights are turned off after the "Closed" period begins - this is to give people time to exit the library before the lights go out. Also when the library is opened, lights are turned on a bit before opening, making sure the library is lit before people start arriving in.

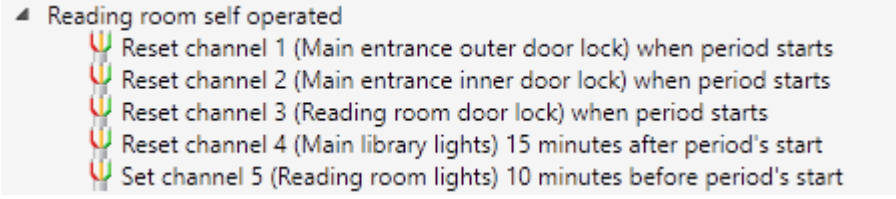
For the purpose of this example, there are no workstation requests or audio requests here.

A typical scheduled day for this library could look something like this:



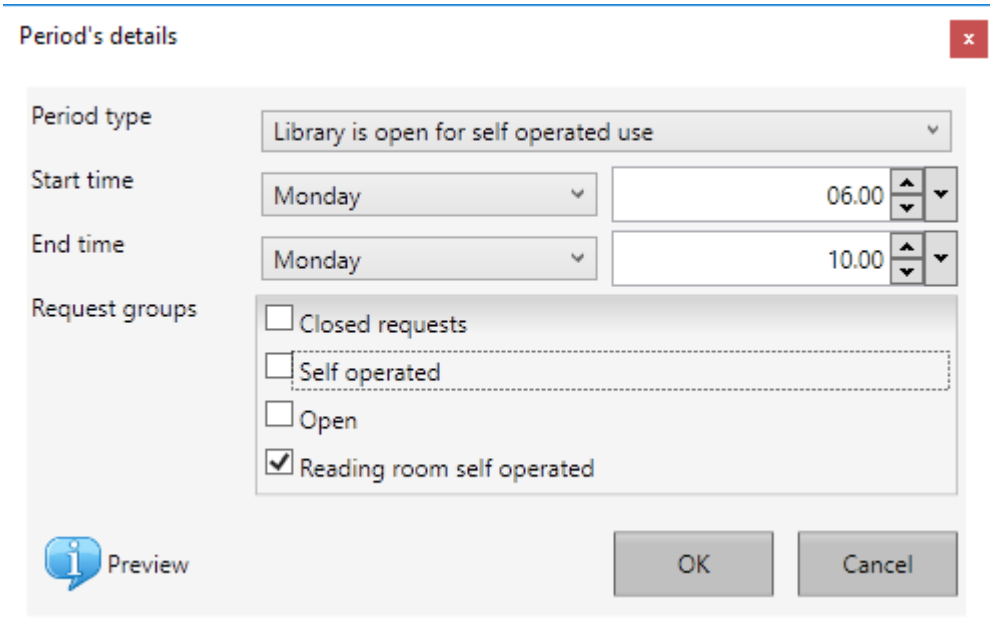
Typical scheduled day

Here, the library opens at 8 in the morning, goes into self operated mode at 5 in the afternoon and closes at 10 in the evening. Now suppose that the library wants staff to arrive at 10 in the morning, but newspapers are available since 6 in the morning. This could be done by creating a different request group which only opens the reading room, and making a self operated period in the schedule for that. A new request group could look like this:



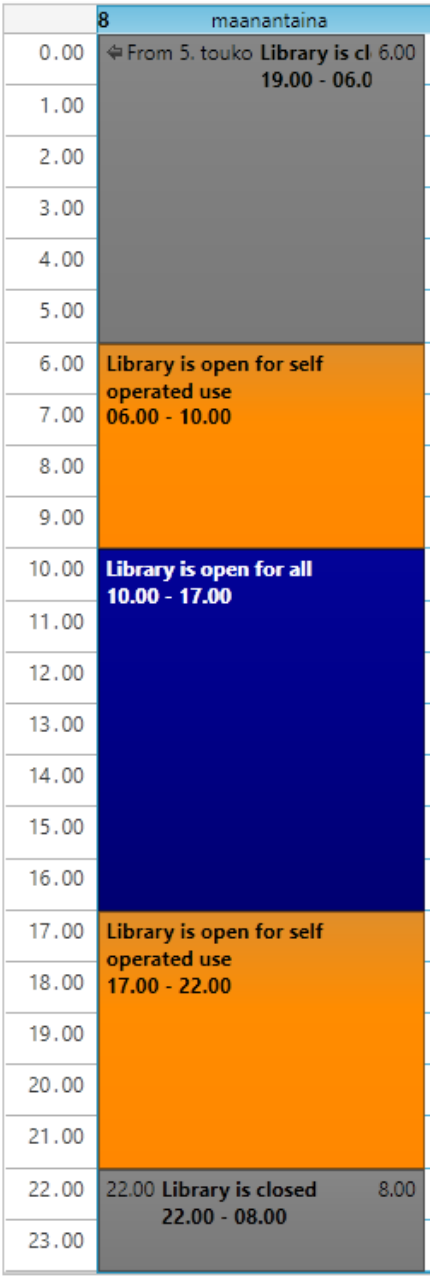
Requests for reading room self operated period

That is, lights are turned on in the reading room but the main library is closed and lights are turned off. It is now possible to add a self operated period in the morning, and select not the default request group but this reading room request group instead:



Adding a period for self operated reading room period

Now the schedule would look like this:



Scheduled day with a reading room self operated period

Note that this example is an overly simplistic one; there is no control in this example to prevent users from entering the rest of the library, even though the lights are turned off. For this you would need another set of IO requests that would prevent the doors from opening - for example, there could be one extra relay before the main door locks, which is opened (reset) thus preventing the normal door lock connections from functioning on those doors, or something similar.

Access control

Normally access to library during self operated times is controlled by the library system; either through SIP connection or another means, such as Mikromarc authentication API. It is also possible to create specific rules that allow or block access to a library branch. These can be used to allow cleaning staff or security guards or library staff access, without requiring that they are patrons in the library system.

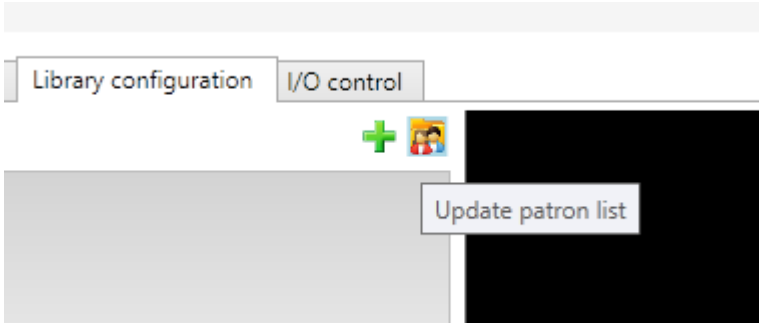
It is also possible to block patrons so that even if they are allowed access based on information in the library system, they will still be denied access based on specific, overriding rules.

These rules are created on the main level, and they are stored and enforced by Master controller. It is then a choice per rule to which library branches it applies. This means, that a single entry can be made to allow a security guard access to all libraries in the system, or a maintenance worker to just one branch library.

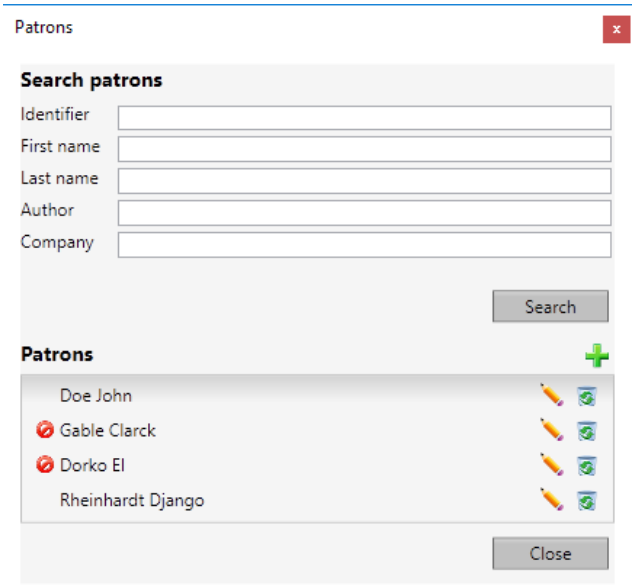
We strongly advise to not abuse this function by making it a primary means of access control; it is only ever intended as a way to create a very small number of access or blocking rules, not a whole patron list of the whole library. There are no advanced features for handling large numbers of patrons, nor is the system performance designed to handle more than a handfull of entries.

Important note: This access control is a whitelist / blacklist function. Thus, it is in effect regardless of the library opening status. If a person is on a whitelist to allow access to a library, they have access also when the library is closed.

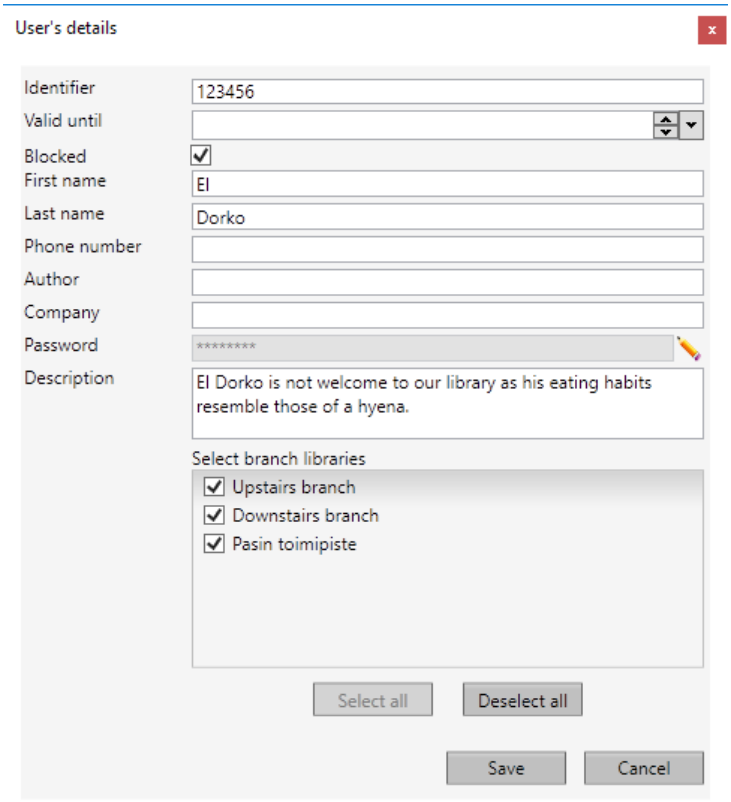
To see and modify these access rules, click on the *Update patron list* button on top of the libraries treeview, in SOL Administator:



This opens the Patron list window, displaying existing entries and allowing filtering using the fields on top of the list:



The example above shows two patrons (El Dorko and Clark Gable) being blocked, the others are allowed through. Each entry has details as follows:



Blocked patron information

You can see in the example above that the patron identifier is 123456, and that the patron has been blocked from all libraries. This means that if this identifier is scanned on an entrance system, it will automatically be blocked without even asking the library system.

If the *Blocked* checkbox is not marked, it means the user is allowed access to selected libraries. This enables people such as security guards and cleaning crew access, without being in the library system.

The *Valid until* date can be set to limit the time until which this login rule is valid; after that, the rule is not checked. This is intended as a safeguard for temporary users, like summer employees; it is easy to give them access until their employment term ends, and it is not a problem if you don't remember to cancel it, if you have set the Valid until date - their access will be not valid after that day.

- end of document -